PROCEEDINGS

OF THE

AGRICULTURAL CONFERENCE

HELD IN THE

REVENUE AND AGRICULTURAL DEPARTMENT

SIMLA

ON THE

6th, 7th, 8th, 9th, 10th, 11th and 13th October 1890.

WITH APPENDICES.

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INDEX.

	Page.
Proceedings of the First Meeting—The President's Opening Address ...	1
Proceedings of the Second Meeting—Scientific Investigation	7
Proceedings of the Third Meeting—Investigation by means of Experimental Stations or other similar Agency	17
Proceedings of the Fourth Meeting—Agricultural Education	31
Proceedings of the Fifth Meeting—Agricultural Education	53
Proceedings of the Sixth Meeting—Agricultural Education	67
Proceedings of the Seventh Meeting—Agricultural Enquiry	73

Resolutions passed at the Agricultural Conference.

[For Resolution convening the Conference, *vide* Appendix A, page i.]

Second Meeting.

Resolution I.—That the first appointment of an Agricultural Chemist should be made for seven years.

Resolution II.—That travel is, for the reasons given by Dr. Voelcker, an essential part of the duties of the Agricultural Chemist, but that it is premature to lay down now any conditions as to the selection of special districts for close study.

Resolution III.—That the Agricultural Chemist should be given a well equipped laboratory in a suitable place, and, looking to the desirability of utilizing the services of his Assistant for educational purposes, the Conference agrees that the laboratories should be at Dehra and Poona.

Resolution IV.—That he should be given a competent Analytical Chemist as Assistant. That the Agricultural Chemist should not, but that the Assistant should, be employed in the actual work of teaching.

Resolution V.—That the salary offered for the Agricultural Chemist should be sufficient to secure the services of a really first class man, and that the salary be left to Her Majesty's Secretary of State.

Resolution VI.—That the salary of the Assistant be R500 rising to R700 a month.

Resolution VII.—That the Agricultural Chemist should be debarred from taking fees under all circumstances.

Resolution VIII.—It should be the duty of the Agricultural Chemist to give his advice on agricultural questions submitted to him by Local Governments.

Resolution IX.—That the Conference express no opinion on the remaining suggestions in parts 'Conditions for success' and 'Laboratory' of Dr. Voelcker's note.

Third Meeting.

Resolution I.—That if any attempt is to be made by Government to further agricultural improvement, it is highly desirable to maintain in each province a system of farms for enquiry and experiment; and that for the proper conduct of them, for securing continuity of enquiry, and for communicating information to officials and the public, the services of a competent adviser of the character recommended at the meeting of this Conference on the 7th* instant is indispensable.

* *i.e.*, the second meeting.

Fifth Meeting.

Resolution I.—In considering the question of agricultural education and progress, the Conference desires to express the opinion that it is most desirable to extend primary education among the agricultural classes.

Resolution II.—That, as a general rule, instruction in agriculture should be combined with the existing course of education, and not depend *exclusively* on separate special institutions.

Resolution III.—Resolved that it is most desirable that the Universities should recognize the science of agriculture as an optional subject in the course for a degree.

Resolution IV.—That it is very desirable that the elementary principles of agriculture should form a prominent subject in the education which is given in village schools with the view of creating more interest in agricultural improvement amongst the cultivating classes.

Resolution V.—Resolved that, in order to secure the object of the last resolution, it is desirable to take early steps to provide suitable teaching, the best books and "readers."

Resolution VI.—It is highly desirable that the claims of men trained in Scientific Agriculture to appointments in the Revenue and cognate Departments should be as freely recognized as those of men trained in Law, Arts, and Engineering.

Resolution VII.—That where appointments in the Revenue or cognate Departments are made on the result of competitive examinations, Scientific Agriculture should be included as an optional or necessary subject in the examination course.

Resolution VIII.—Resolved that in any province in which it may be determined to introduce a scheme for higher agricultural education, no arrangements will be satisfactory which do not provide (1) for a thoroughly practical training of the students in the field and laboratory as distinct from theory or practice as taught in the lecture room, and (2) for examination tests of a special and searching character in the above branches of work.

SIXTH MEETING.

Resolution I.—Further, that it is desirable that it should be considered whether a certain percentage of the appointments mentioned in the previous resolution * of all grades should not be reserved for candidates who have passed prescribed agricultural tests or whether at least a preference should not be given to such candidates.

* *i.e.*, Resolution of fifth meeting.

Resolution II.—That, in the opinion of this Conference, it is essential for the proper performance of the duties demanded from the Agricultural Department in the direction of agricultural improvement, that the Director of the Department should be provided with an Assistant or Assistants who are experts in the practice and theory of agriculture.

Resolution III.—That it will be preferable to train natives to be qualified for the post of Assistant in the Agricultural Department in this country rather than in Europe, and that this end cannot be attained unless there be a high class education established in this country.

SEVENTH MEETING.

Resolution I.—That where practicable agricultural statistics should be compiled by the village officers or agency for every village or estate in each province.

Resolution II.—That where such are compiled, some system should be adopted under which the leading facts and statistics indicating the agricultural condition of the village or estate for each year should be abstracted in a simple form.

Resolution III.—That these forms should be brought together in a special volume to be maintained for each administrative circle, *e.g.*, Revenue Inspector's circle, pargana, &c., in which district officers should from time to time enter remarks, if required, on the progress or degradation of the villages or circle.

Resolution IV.—That some system should be established ensuring that the information contained in the forms shall be utilized by the district authorities.

Resolution V.—That it should be the special duty of the Agricultural Department to ascertain from time to time by inspection that the forms are properly maintained and efficiently utilized for each district.

Resolution VI.—That the district analysis contemplated by the Government of India Resolution of 1881 will be effectually provided for by the settlement reports and records, supplemented by the annual abstracts of village statistics. But that it will be also useful that the Agricultural Department should collate and publish, or encourage the collation and publication from time to time of general information and statistics showing the agricultural condition of each district either in short abstracts or in such volumes as the Statistical Atlas of Bombay, or, where statistics are not available, such reports as those of Mr. Sen's and Mr. Basu's on the Dacca and Lohardugga Districts in Bengal.

NOTE.—No Resolutions were passed at the 1st and 4th meetings.

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Proceedings of the Agricultural Conference.

First Meeting, Monday, the 6th October 1890.

PRESENT:

SIR E. C. BUCK, KT., *Secretary to the Government of India, Revenue and Agricultural Department.* } President.

HON'BLE W. C. BENETT, *Secretary to the Government of the North-Western Provinces and Oudh.*

H. F. CLOGSTOUN, Esq., *Commissioner of Settlements and Agriculture, Madras.*

DR. T. COOKE, *Principal, College of Science, Poona.*

M. FINUCANE, Esq., *Director of Land Records and Agriculture, Bengal.*

J. B. FULLER, Esq., *Commissioner of Settlements and Agriculture, Central Provinces.*

J. B. HALLEN, Esq., *General Superintendent, Horse Breeding Department.*

T. H. MIDDLETON, Esq., *Professor of Agriculture, Baroda College.*

E. C. OZANNE, Esq., *Director of Land Records and Agriculture, Bombay.* } Members.

F. A. ROBERTSON, Esq., *Director of Land Records and Agriculture, Punjab.*

E. B. STEEDMAN, Esq., *Deputy Commissioner, Hoshiarpur, late Director of Land Records and Agriculture, Punjab.*

R. G. THOMSON, Esq., *Officiating Revenue Secretary to the Government of the Punjab.*

DR. J. A. VOELCKER, *Consulting Chemist to the Royal Agricultural Society of England.*

J. W. P. MUIR-MACKENZIE, Esq., *Under-Secretary to the Government of India, Revenue and Agricultural Department.*

THE PRESIDENT'S OPENING ADDRESS.

GENTLEMEN,—In opening this Conference I desire to explain that its proceedings must be based on the correspondence of the Government of India with the Secretary of State on the subject of an Agricultural Chemist, concluding with the mission of Dr. Voelcker to this country, and with the Resolution,* dated the 25th March 1890, in pursuance of which this Conference has been convened.

The latter Resolution deals somewhat briefly with the duties and work performed by Agricultural Departments since the foundation of the Imperial Revenue and Agricultural Department in 1881, and with the present position of these Departments throughout the Provinces of India. I propose to deal with these subjects still more briefly now.

The new Departments were the outcome of the recommendations of the Famine Commissioners which Her Majesty's Secretary of State summarized in a despatch of 1881 as requiring the establishment (1) of a system of "agricultural enquiry;" (2) of measures for "agricultural improvement" and prevention of famine; and (3) of measures for famine relief on the occurrence of famine or scarcity.

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* Appendix A.

The Government of India was in pursuance of this despatch required to suggest the broad principles on which action should be taken to secure the above objects, and fulfilled this duty in the opening Resolution of December 1881, which sketched the general policy that would be followed in the development of Agricultural Departments and in the conduct of their duties, and that policy has been steadfastly and continuously maintained to the present date. General principles were laid down for the conduct of agricultural enquiry in (more or less) connection with the work of land settlement and the provision of annual land records; and instructions were issued as the basis of a code of famine relief for each province. On the other hand positive measures in connection with agricultural improvement were to be postponed until enquiry and investigation had reached a more satisfactory stage. Earlier action was deprecated because it was foreseen that Agricultural Departments could not undertake the expenditure of public money for agricultural improvement without a greater knowledge of agricultural conditions than then existed, or without the assistance of first class experts; and it was considered prudent to defer any material expenditure which would be involved by practical action (1) until arrangements in connection with land records for a thorough investigation of agricultural conditions had been completed; (2) until the Agricultural Departments had proved that in carrying out this duty they could be of direct financial service to the State independently of any indirect advantages which might subsequently be obtained by agricultural improvement. It was well this course was taken. The Departments created by the Famine Commission of 1880 were challenged by the Finance Commission of 1889 to show that the cost of them was justified, with the exception of Madras, of which the circumstances were exceptional. The work of the Agricultural Departments (now called Departments of Land Records and Agriculture) in connection with land records was found to result in direct financial gain—in some cases very large—to the State Exchequer. It is right that this fact should be thoroughly appreciated. For if the Departments had followed the policy not unnaturally dictated by certain sections of the public and of the Press in the direction of anything like lavish expenditure on attempts at agricultural improvement, which could only have been of a crude and unscientific character, instead of confining their chief efforts to administrative duties of an immediately useful kind, they could not have outridden the storms which have been raised by the financial difficulties that have occurred at intervals since 1881. They would have justly shared, indeed, the condemnation which the Madras Government has bestowed on expenditure prematurely incurred upon attempts at agricultural improvement in that Province.

But the work of the Departments in connection with land records, although primarily useful to the State for purposes of Land Revenue administration, has at the same time provided an important and continuous supply of information concerning the agricultural conditions of every section of the country, which was one of the objects demanded by the programme of 1881. With this basis, and with the knowledge that they have secured, and are continuing to secure, an important improvement in the financial position of land administration, Agricultural Departments are now justified in claiming that means should be given to them to fulfil the duties in the direction of agricultural improvement imposed upon them by the orders of Her Majesty's Secretary of State in 1881. This was the position taken up in the despatch to Her Majesty's Secretary of State, No. 197, dated 21st July 1888, which is before you. We have now to consider how far the proposals which were embodied in the despatches to the Secretary of State require, in the opinion of the Conference, to be modified by the report which Dr. Voelcker has submitted, or by the discussions which may be held during the sitting of the Conference on the various issues concerned. Dr. Voelcker was sent out—and it may be admitted was wisely sent out—to India by Her Majesty's Secretary of State in order to secure a more accurate judgment upon the policy urged by the Government of India in accordance, I may add, with the general recommendation of the Delhi Conference of 1888. The main duty of this Conference is undoubtedly a serious reconsideration of that policy in the light of Dr. Voelcker's evidence and advice.

It seems desirable to point out that the Government of India is restricted by its position to the enunciation of general principles which should, in connection with agricultural improvement as well as with other subjects dealt with by the Famine Commission, be adopted by the Provincial Governments and Departments. It cannot deal with details concerning executive management and administrative arrangements. The object of the Conferences which have been held, and which it is the policy of this Department to maintain in connection with agricultural questions, is to secure the enunciation by the Government of India of those general principles which it is required to lay down in such form as will be *primâ facie* acceptable to Local Governments. The views of the delegate from any one province are accepted, therefore, not as the final opinion of the Government of the Province represented, but merely as views which are not likely to be at variance with those of the Provincial Government, and calculated therefore to lead to the final establishment in correspondence with Local Governments of a policy more sound and less open to subsequent alterations than would be the case if the general principles upon which it is to be based were to be originated solely by the Government of India on a subject in connection with which advice on technical matters is essentially needed. This was explained in the Resolution of the 25th of March last.

The above remarks have been made, as I have explained, partly with the object of pointing out to the Conference the desirability of confining discussion as far as possible to general principles and issues of such wide character that they can be held to be applicable to all parts of India. In this view it would, in connection with Dr. Voelcker's note, be the function o the Conference to consider the leading features and principles of the system which should be adopted to secure the development of agricultural improvement rather than to discuss any of the detailed issues raised in Dr. Voelcker's note, such as, for instance, whether dairying is capable of development in large towns. Issues of the latter class must be dealt with in each case by the Agricultural Departments under the instructions of the Local Governments concerned. It is the duty of the Government of India only to enunciate the principle that such agency should be established, whether in provincial or national centres, as will enable the Local Government to carry out those investigations and experiments which will lead to a sound decision on *questions* of the kind.

In this view the most important function of the Conference in connection with Dr. Voelcker's mission is to consider generally, without special regard to any subordinate issue, firstly, whether the possibilities of improvement are sufficiently important to justify the gradual establishment of a sound system of scientific investigation as well as of education in connection with agriculture; and, secondly, what the general character of that system should be. The last despatch of Her Majesty's Secretary of State, dated 7th November 1889, implies that Dr. Voelcker's advice is required on the second rather than on the first of these questions; and although it will be useful that the Conference should pronounce a definite opinion on both subjects, yet it is to the second that its deliberations should be chiefly directed. A further question relating to the principles upon which the statistics and data annually provided by village establishments can be most effectively utilized for the purposes indicated in the Resolution of 1881 has also to be considered by the Conference; but this is one which is not affected by Dr. Voelcker's mission, and may be dealt with independently.

Assuming for the present that the Conference will confine the importance of the object held in view in the despatches of the Government of India in relation to scientific investigation and agricultural education—an importance admitted by Her Majesty's Secretary of State—I ask permission to make a few suggestions for discussion in connection with the system which should be followed to secure these objects. A forcible remark occurs in the 30th paragraph of Mr. Nicholson's admirable note on the Madras Agricultural Department that it is not merely poverty that prevents increase of produce, but ignorance of possibilities and a low order of intelligence. Accepting,

as I think we may, this proposition as sound, it is clearly the duty of Agricultural Departments in the first place to ascertain possibilities, and in the second to improve the intelligence of the agricultural population. Some people urge that the performance of the second duty would be sufficient; that if the intelligence (including a knowledge of scientific agriculture) of the agricultural population be gradually raised to a higher level, the time must come when they would discover for themselves the possibilities which are now beyond their grasp. This may be admitted. At the same time there can be little doubt that much time would be lost; and few will be found to deny that a long continued series of investigations and experiments conducted under really competent direction will be of very great value to the educated farmers of a future generation. It may also be urged that a series of experiments scientifically directed in each province will be in itself a valuable, if not a necessary, aid to popular education in agriculture. If we are to look to the people of India to work out eventually their own agricultural salvation (I am quoting these words), it is essential that they should be taught among other things how to make experiments on a sound and intelligent method. For these reasons it seems desirable that side by side with the gradual education of the agricultural classes, a system of investigation and experiment should be inaugurated. I will venture to give an illustration. Thanks to Lord Reay, there has now been established a Bacteriological institution at Poona under the general charge of Dr. Cooke, to which is attached a selected Veterinary officer, and (we owe this to Dr. Cooke's personal and self-sacrificing efforts) a first class Bacteriological expert from Europe. These officials will commence and continue over an extended period a series of careful experiments and investigations in connection with the diseases of cattle and other animals in India.. It may be expected that in the course of a few years a considerable amount of knowledge as to the nature of animal diseases and their effectual treatment will have been obtained, and that some at least of the "possibilities" in connection with the treatment and cure of cattle diseases will have been discovered. At present the Legislature, the Veterinary officials themselves, and the native owners of cattle are groping in the dark. Without scientific investigation they do not and cannot know the real character of the diseases which decimate the cattle—much less how to treat them—any more than they now know the exact nature of agricultural soils or understand the possibility of improving them by the application of imported or special manures. Our investigations of the next few years will provide a material amount of useful facts and information: our education of the next few years will enable the native agriculturists to utilize it. The following is an amusing illustration of the costly results of ignorance of local conditions.

Only a year or two ago an account was given to me by a Veterinary officer of some standing in connection with a mission on which he was sent to Natal armed with a supply of vaccines and medical apparatus for the purpose of dealing with a serious outbreak of anthrax which had broken out in that Colony. The first application of the microscope resulted in the discovery that the disease was not anthrax at all. The germ was another germ, though the mischief it caused was very similar to that effected by the anthrax germ. Vaccines and apparatus were useless, and the expenditure devoted to the mission was, except so far as it served to supply a valuable lesson, incurred in vain.

To return to Poona and its Bacteriological College. While the experts there are carrying out their investigations and enquiries during the next 10 or 20 years, a certain number of native scholars will be so instructed as to qualify them to serve under Local Governments as cattle inspectors and doctors for the purpose (1) of conducting enquiries required by the central experts; (2) of carrying out the treatment prescribed by them; and (3) eventually, when the educational system has been sufficiently reformed, of themselves continuing the bacteriological investigations for which the initial enquiries of the European experts will have provided a basis.

So in agriculture. A series of investigations and experiments should now be undertaken under the general direction of first class experts, at

the same time that the education of natives should be provided for in such a way as to enable them to utilize the results and continue the enquiries for themselves at a future period. Investigation conducted under the guidance of first class experts (I won't admit that it will be so with second class experts) must yield results. What those results will be—what, in other words, are the possibilities—I do not think we can pretend to define or prophesy. Who, for instance, in Natal could have predicated that a scientific investigation of their animal diseases would have resulted in the discovery that *anthrax* was *not anthrax*? We must proceed on the broad argument, which is apparently accepted by Her Majesty's Secretary of State, that investigations directed by scientific men of first rank must yield results. Who can prophesy whether those results will be great or small; or who can estimate now their financial effect? The point is that no one is justified in asserting that they will not be of vast importance to the Empire. This is the view taken by the two most practical nations of the world —America and Germany,—and we shall not be far wrong in following their lead. They proceed on the assumption that knowledge means money and power—both. In the fierce strife which is imminent—which has indeed already begun—among the nations of the world in the field of production, those whose agriculturists are most fully trained, or, to borrow an useful phrase, "equipped with knowledge" at the earliest date, will have the best chance. Agricultural improvement was defined in our Resolution of 1881 as the process of raising agricultural conditions to the highest level of efficiency, and that goal can only be reached by slow and gradual steps. The first of these is scientific enquiry; the second is practical education.

I have concluded my remarks, and now propose that the Conference should deal with the subjects before them, so far as they are connected with agriculture, in the following order :—

(1) The appointment of an Agricultural Chemist and staff for purposes of original investigation.

(2) The duties of an Agricultural Chemist in connection with experimental farms.

(3) Agricultural education, and the relation of an Agricultural Chemist thereto.

I would add that any member of the Conference who desires to do so is invited to submit a note on each or all of these subjects.

Dr. Voelcker said he had nothing of much importance to alter in his preliminary notes, with the exception of that relating to agricultural education, which he was disposed to regard much more favourably than when he concluded his first tour. He had also some eight or nine additions to make to the "list of possible improvements" mentioned in the memorandum. These were read.

The *President* next proposed the order in which the subjects mentioned in the programme provisionally drawn up for the Conference should be discussed. He suggested that the meeting should in the first instance confine itself to Part II, Agricultural Experiment and Improvement, under the heads A (Scientific investigation) and B (Investigation by means of experimental stations or other similar agency), and Part III, Agricultural Education. If time allowed, the other subjects mentioned in the programme might be taken up.

This having been agreed to, a general discussion took place upon the appointment and functions of an Agricultural Chemist. The Conference was unanimously of opinion that, apart from the requirements of agricultural education, the appointment of a chemist was necessary for purposes of scientific investigation. It was agreed that he should occupy the position of a referee

and adviser to the Government upon agricultural questions. It was then determined to postpone further consideration of the duties, functions, and qualifications of the Agricultural Chemist until the following day, when the question could be taken up in detail under the first head suggested by the President.

Proceedings of the Agricultural Conference.

Second Meeting, Tuesday, the 7th October 1890.

PRESENT:

SIR E. C. BUCK, KT., *Secretary to the Government of India, Revenue and Agricultural Department.* — President.

HON'BLE W. C. BENETT, *Secretary to the Government of the North-Western Provinces and Oudh.*

H. F. CLOGSTOUN, Esq., *Commissioner of Settlements and Agriculture, Madras.*

DR. T. COOKE, *Principal, College of Science, Poona.*

M. FINUCANE, Esq., *Director of Land Records and Agriculture, Bengal.*

J. B. FULLER, Esq., *Commissioner of Settlements and Agriculture, Central Provinces.*

J. B. HALLEN, Esq., *General Superintendent, Horse Breeding Department.*

T. H. MIDDLETON, Esq., *Professor of Agriculture, Baroda College.*

HON'BLE P. NOLAN, *Secretary to the Government of Bengal.*

E. C. OZANNE, Esq., *Director of Land Records and Agriculture, Bombay.*

F. A. ROBERTSON, Esq., *Director of Land Records and Agriculture, Punjab.*

E. B. STEEDMAN, Esq., *Deputy Commissioner, Hoshiarpur, late Director of Land Records and Agriculture, Punjab.*

R. G. THOMSON, Esq., *Officiating Revenue Secretary to the Government of the Punjab.*

DR. J. A. VOELCKER, *Consulting Chemist to the Royal Agricultural Society of England.*

J. W. P. MUIR-MACKENZIE, Esq., *Under-Secretary to the Government of India, Revenue and Agricultural Department.*

— Members.

SCIENTIFIC INVESTIGATION.

The *President:* To-day we will take up the first of the four subjects decided on for discussion: *i.e.*, the appointment of an Agricultural Chemist and staff for the purposes of original investigation. Dr. Voelcker's note on the subject will furnish the basis of the discussion, and it is proposed that Dr. Voelcker's proposals as they stand now should be submitted for the criticisms of the Conference. I will ask any member, beginning with the member on the right, whether he has any remarks to make tending to modify or alter Dr. Voelcker's proposals.

Mr. Ozanne: It is extremely satisfactory to find that, after his enquiry during the past year, the grounds put forward by Dr. Voelcker for the appointment of an Agricultural Chemist are almost the same as were urged in the Conference of 1883; in other words, that the officer deputed by the Secretary of State has strongly supported the proposals made in 1883, *viz.*, that, first, investigation should be taken up; next, that the Agricultural Chemist should advise on the programme to be followed on the farms; and, finally, that he should publish the results of experiments made. I think specially well of the suggestion that is made to ask for two Agricultural Chemists in order that one may be free for investigation and advice, while the other, besides performing his duties as Assistant, may possibly be utilizable for other important purposes. The only alteration I should like to see made in the preliminary note by Dr. Voelcker is that, instead of saying "special or typical district" (second paragraph of the Conditions of Success, page 5), it will be well to suggest that the districts first chosen for close study should be those in which experimental farms now exist, so that the experimental work on those farms (which must be guided by the particular wants of the district concerned) may be put on a proper footing at the very beginning. Another point that I wish to bring out

clearly is the suitability of Poona as one of the places in which the Assistant should be resident for a certain number of months in the year. The Bombay Government has already offered to pay the salary for three months in the year to secure the presence of the Agricultural Chemist at Poona for that time at least.

That was done when the intention was to have only one man, but as we have now the hope of securing two men, I think that the year might be divided into six months for Poona and six months for Dehra. I think it extremely suitable that Dehra should have the laboratory for Northern India and Poona for Southern India. There is a report* by a Bombay Committee, which will be put before the Conference, in which the laboratory facilities at Poona are described. Poona is the very centre of a typical agricultural district, and also at Poona we have the Imperial Bacteriological Laboratory already established. It is expedient that investigation should be concentrated even though the investigators will not work together. I therefore think that a great deal is to be said for Poona as the location of one of the laboratories. There is another reason. Poona has an extremely good climate in the rains, while Northern India has rather a poor one ; and as it is very advisable that the men should be in the best climates for work, that result can well be obtained by having Poona and Dehra as the two centres. I do not wish to make any further remarks except to support very strongly the proposals made by Dr. Voelcker.

The *President*: I should be glad to know if the members agree that the Agricultural Chemist should combine or not the functions of agricultural investigation and agricultural teaching.

Mr. Robertson: I certainly think that the Government of India should obtain the services of an Agricultural Chemist of high attainments. He should be employed mainly as an investigator, and should have every facility for visiting all parts of the country and making himself acquainted with Indian agriculture. Such a man is much wanted in India ; there is no body such as the Royal Agricultural Society of England who could employ such a man, and I think it is the duty of the Government, who alone *can* do so in this country, *to* do so.

Such a man would also be very useful as an adviser on agricultural experiments and experimental farms, and generally as an adviser and referee to Government on all questions connected with Agricultural Chemistry, and he would be able to enquire into many questions which call urgently for such enquiry as only an expert can undertake satisfactorily.

We should give such a man to a considerable extent a free hand, allow him to work very much on his own lines, and not press him too early for results.

I do not think he should be employed at all in teaching ; his time will be very fully occupied in other ways.

I quite agree that he should have an Assistant fully qualified, who would work in the laboratory, and could be also usefully employed as a teacher. I think it would be well to have two laboratories on the whole—one for Northern and one for Southern India,—and the second expert might spend half his time at each place ; but I am not so clear upon this point as upon what I have already said.

The Agricultural Chemist would be useful as an adviser on the practical portion of any educational scheme, but from what I have seen of scientific experts while studying science, as I did for a long period, I would say that there is nothing in the training of a scientific expert which would justify our predicating that he would be a valuable adviser on any general questions of higher education in the direction of Agricultural Science, and I think the expectations of some of the members of the Conference on that point are not well founded.

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* *Vide* Appendix B.

The *Hon'ble Mr. Benett* considered that one of the greatest uses of having a really good Agricultural Chemist in this country would be for agricultural education. The people of the North-Western Provinces have a very strong desire for technical education; they do not care so much for literary as for technical education. For this purpose the Talukdars of Oudh have promised very liberal subscriptions. But in order to start an Agricultural College competent advice is needed.

The *President*: I quite agree, but we shall have a further opportunity of discussing the educational functions of the Agricultural Chemist.

The *Hon'ble Mr. Benett*: I do not think he ought to be used as a teacher. It is indispensable that agricultural education be connected with an University. Without that there is not the slightest prospect of it being a success, and pupils won't come over in any great numbers. But if we get a local school supported by local direction and attached to our University course, we shall want the advice of an Agricultural Chemist; he would offer advice, not teach himself.

The *Hon'ble Mr. Nolan* observed that the appointment of an Agricultural Chemist appeared desirable, provided a gentleman could be found for the office who had, like Dr. Voelcker, a practical acquaintance with English agriculture as actually carried on. In Bengal there were already a Professor of Chemistry, several members of the Medical and Opium Services possessing special acquirements in that line, and Cirencester scholars, who, as natives of India, could readily apply their general knowledge of agriculture to the circumstances of the country. If further academic attainments were necessary, they could be more cheaply obtained by deputing the best of our University chemical students to complete a course in Europe. What we required was a man who had what could not be found in India at present—that is, a real knowledge of English farming. The chemist should, moreover, be employed on practical work, and in this connexion the Hon'ble Mr. Nolan suggested that some procedure should be devised for submission to him of questions on which Local Governments required guidance. In Bengal these might probably be connected at first with the cultivation of tea, indigo, opium, and the production of silk—industries which had made such progress as to be at the stage in which the assistance of an expert is required. Too much stress had, perhaps, been laid on the inventions and original discoveries to be made by such an officer, and with his assistance by the Agricultural Department generally. Such additions to human knowledge came not from Departments or officers retained by Government for the purpose, but from those gifted with rare talent or genius known as the faculty of invention—a gift which the State could never confer.

Mr. Fuller thoroughly agreed in the proposal to bring out to India a highly qualified officer who would fill the position of Agricultural Adviser and Director of Agricultural Enquiry. He thought it most important that such a man should be able to deal with the practical side of agricultural questions, and would prefer a scientific agriculturist to an Agricultural Chemist pure and simple. The direction of agricultural enquiry with a view to practical improvement should be kept distinct from the teaching of Agricultural Chemistry, and an attempt to unite both functions in one man would probably result in failure. For instruction in chemistry a separate man would be required, and in his case too some acquaintance with practical agriculture would be desirable. There could be little doubt as to the utility of an Agricultural Adviser in this country, provided that he was capable of grafting on his scientific attainments a practical acquaintance with Indian agricultural conditions. More was to be done by the development of already existing resources than by the introduction of exotic products or processes. The investigation of local agriculture with a view to improvement was, of course, much more required in some parts of India than in others. Some tracts were already so far advanced that they were hardly capable of improvement, whereas other tracts were extremely backward. If the Government could secure the services of a man who could direct efforts to raise the standard of agriculture in these backward tracts, his salary would be repaid a hundredfold. But time would, of course, be required for local investigation, and results could not be expected till the Agricultural Adviser had gained some Indian experience. He should be assisted in his local

enquiries by trained men working under the provincial Directors of Agriculture. Unassisted he could, of course, do but little in so large a country. As for the separate question of education, it was of the utmost importance that it should be practical and not based on book work only, and it should be one of the functions of the Agricultural Adviser to see that this condition was practically enforced. Mr. Fuller agreed with the description of the functions of the Agricultural Adviser as given in Dr. Voelcker's note. He was convinced of the desirability of keeping the question of agricultural or chemical teaching distinct from that of agricultural enquiry. There should be a separate man for instruction who might be given the official position of Assistant to the Agricultural Adviser, and might be employed on laboratory work in addition to his instructional duties.

Mr. Hallen: I think it is very necessary that the Agricultural Chemist should have a practical knowledge of farming. I go about India, as you are aware, a great deal, and I see that a man holding that position will have great power and influence with Local Governments in being their adviser as to the utilizing of measures perhaps not known in the district he happens to be in, and which he has seen carried out successfully in other districts. I think also that he may be used in collecting information of a practical kind, and in giving it out to India generally in the form of simple primers. I venture to put on the table just a short précis* with regard to the making of hay, which is, I think, one of the most important fodders we have in India, and ought to have. Except in the Madras Presidency, much attention does not seem to have been paid to this subject hitherto. The fact of the matter is that people imagine that hay making is a difficult process, whereas it is a simple process. I think that if it was only commenced in the way indicated in the pamphlet, that by and by the Director of Agriculture or the Agricultural Chemist will be able to improve on the simple measures I have recommended, and no doubt in course of time we shall have good hay instead of the dry brittle grass produced now.

Mr. Steedman: I most thoroughly agree with the proposal to have an Agricultural Chemist, and I have only to add to what Mr. Ozanne has already said and Dr. Voelcker has sketched out in his note, that it is essential that the Agricultural Chemist to be brought out should have some practical knowledge of farming at home: he should not have done all his work in a laboratory; he should be something more than a Laboratory Chemist. It is essential that we should not fix any time for the employment of the Agricultural Chemist. He will come out with a certain amount of knowledge of farming at home and a knowledge of Chemistry. He would have to acquaint himself with the circumstances of local agriculture of every part of India; and to gain acquaintance with one province would take him some time. It would therefore, I think, take him very much longer than five years to gain a knowledge of the general requirements of India. Then as to his Assistant, I think it is absolutely necessary that he should have an Assistant. A certain number of questions will be taken up as soon as he comes out, and meanwhile the most important part of his duties will be learning; and to enable him to do this, he should have some competent man to assist him. As to his position as regards education, I think, whatever it is, it should be entirely subordinate, and entirely secondary to his position as Agricultural Adviser to Government.

Mr. Clogstoun: I think the Madras Government would cordially second the proposal to have an Agricultural Chemist and Assistant to work in the laboratories at Dehra and Poona. We cannot utilize the chemist for the purposes Dr. Voelcker has given, and I think the purposes for which we should use him ought to be specified by the Conference. We might utilize him in all these ways, but I think some of them should be modified. As regards clause (8) on page 4 of Dr. Voelcker's note, watching at Government experimental farms, &c., the objects might be revised. I do not see how he would be in a position to control the experiments, and I do not see why the publication of the results should be through the chemist's authority only. There are a very large number of experiments in which the chemist as

* *Vide* Appendix C.

chemist is not interested at all, such as experiments with ordinary farmyard manures, experiments with new implements, &c.

The *President* thought that Mr. Clogstoun's question was connected with experimental farms, which would be discussed at a later meeting. He asked Mr. Clogstoun to state his views as to the connection of the chemist with experimental farms, because his relations with experimental farms will not be much modified.

Mr. Clogstoun : I think the duties of the Agricultural Chemist are very clearly and correctly laid down by Dr. Voelcker as given at page 4 of his note. With regard to clause (8), I wish to remark that I do not see that the Agricultural Chemist could control experiments in Madras with any advantage. I do not see how he could enforce control on any experiments. There are a very large number of experiments. They are specified at page 8 of the Madras Agricultural Committee's report. There are other experiments mentioned by Mr. Benson, the Assistant Director of Agriculture, in which a chemist would have practically no concern as chemist. I do not see that the control of experiments should be entrusted to him, or that we should look to him for sanction to the publication of the results of experiments which are mainly the experiments which we shall now be conducting in Madras. I should propose that we should only look to him as an advising or consultative officer with regard to the results of any experiments in which chemical advice is necessary. I would strike out the words "advising, &c." I would like Dr. Voelcker to tell us what special object he had in view that we are likely to undertake which would require watching.

Dr. Voelcker : My view on that point, and what made me put this in, is practically expressed in a note which I have written in connection with questions on experimental stations. In the past there have been only reports by experimental farmers, and the number of results to which publication has been given are, to any one critically examining them with scientific knowledge, incorrect in themselves; and I consider that more harm is done by publishing a large series of these results, which no one can carry in their heads, than is done by having really good experiments, which may be adopted, and from which definite results may be got and definite knowledge gained; and, with all due respect to practical farmers even in England, I should never think of accepting off-hand the so-called experiments of farmers, because they all want subjecting to scientific methods, and no one, except he is of a scientific turn of mind, is able to deal with these matters, and to say which of them there is truth in, and which of them it would be advisable to reject. That is really what I had in view.

The *President* suggested that this question would be better discussed when Section B, Part II, of the programme on the subject of the investigation by means of experimental stations or other similar agency came to be discussed.

Mr. Finucane : I entirely agree with what has been said, especially by Messrs Nolan, Fuller, and Benett, and I agree with Mr. Fuller in thinking that the Agricultural Chemist should be separated altogether from the teaching staff, whether at Dehra, Poona, or elsewhere, and that each Local Government should be left to make its own arrangements for teaching Agricultural Chemistry. If they find it necessary to have an agricultural teacher for Chemistry in Calcutta, they should be allowed to have one without reference to Dehra or Poona. Bengalis will not go to Dehra or Poona to learn Agricultural Chemistry, and therefore it will be necessary to make arrangements for teaching Agricultural Chemistry at Seebpore.

The *President* asked Mr. Finucane if he objected to the scheme for the appointment of an Agricultural Chemist and an assistant teacher who shall teach at Dehra and Poona? Mr. Finucane said he did not object.

Mr. Robertson : I wish to add a remark on the question of getting an agricultural expert out from home. I am not a Cirencester man, but at one time I saw a good deal of a certain number of men who stand high in scientific circles, and I think we are expecting too much if we expect all that seems to be considered necessary by some members of the Conference from a scientific expert.

Scientific men, as far as I know them, are men of high attainments *in their own line*, and what we require is an Agricultural Chemist who is a man of such attainments in that particular line. I think I am right in saying (Dr. Voelcker can no doubt correct me if wrong) that all the men who could at present be said to stand high as Agricultural Chemists are more or less connected with or in charge of experimental farms or stations. This is the class of man I think we want in this country—a man who is at once a good chemist in the laboratory and acquainted with practical farming in its scientific side. He should be employed in enquiring into agricultural conditions in this country and in making or superintending experiments and researches both in the field and in the laboratory, and he could no doubt give useful general advice on subjects connected with scientific education in agriculture.

But to expect an expert of this kind to draw up schemes of higher scientific education is, I think, to expect too much, and to expect something somewhat foreign to his avocation.

I think we should keep such a man to the work of investigation, experiment, and general advice on agricultural questions, and we should, as far as we possibly can, give him a free hand to pursue his proper work.

Mr. Middleton: I think that what Mr. Robertson has just said explains the Hon'ble Mr. Nolan's difficulty about salaried men and the making of scientific discoveries. Salaried men have to do what their employers ask them to, and when no good results follow their work, it is very often because of the multitudinous duties they are expected to perform. The experience of Germany—in fact, of all countries that have gone in for investigation— is that salaried men do make original discoveries when given time and opportunity to specialize in some particular branch.

The *Hon'ble Mr. Nolan*: I do not know whether it is worth my adding by way of explanation that I do not maintain that the receipt of a salary is a special disqualification for making inventions. I merely hold that it could not confer that power, which is rare, and, where it exists, manifests itself without a salary.

Mr. Muir-Mackenzie: I beg to instance the discovery by Dr. King of the manufacture of quinine as that of a highly salaried officer who effected a notable discovery.

The *Hon'ble Mr. Nolan*: Was he salaried to invent?

The *President*: I have one or two remarks to make on what has been said. As to the suggestion about procedure, some procedure should be laid down for the Local Government making references to the Agricultural Chemist. The Government of India would be just as glad as any Provincial Government could be to see every province equipped with a staff of its own; and we have only made this beginning of having one man in two national centres because, so far as we have gone, we have been unable to get even one man, and it is not intended that the Agricultural Chemist or his Assistant should be Imperial in his functions so much as national in his functions, and it would be open to any Provincial Government which wishes to make use of his services to apply for them. Rules will be laid down to that effect. It is not intended that the operations of the Local Government in connection with the researches connected with Agricultural Chemistry should be controlled by the Imperial officer, or that they should not be able to utilize the services of the officer whom I prefer to call national and Imperial. This officer should be of equal relative service to all provinces. Rules will be laid down by which all officers as far as possible shall have an equal share in his services, so that I think that what the Hon'ble Mr. Nolan wishes will entirely fall in with the wishes of the Government of India and the Local Government on the subject. As regards the character of the chief officer whom it is proposed now to ask for, the position has been, of course, a good deal altered by the fact that two officers are proposed instead of one. The original proposal was initiated by the requirements in the first place of the Dehra Forest School for a teacher of Agricultural Chemistry; in the second place, by the requirements of the Poona College for a similar officer. The Government of India said that if an officer is wanted at all, cannot we combine these two requirements and get a first class man instead of two

second class men? Now, we have come to the modification of the original proposal by asking for one first class man and one second class man. In that case the first class man can, of course, be relieved of educational duties, and be made available for other duties; and it will be open for us to expect from him further duties than were expected from the man whom we originally asked for, whose time would have been a great deal taken up by his educational duties. How far under these new conditions the chief man is to be a practical agriculturist, and how far he is to be a pure Agricultural Chemist, I think we had better leave open until our further discussions have taken place. But I quite agree with what has been said that in one respect we should insist on his being a first class Agricultural Chemist. I think there would be great danger of Provincial Governments resenting a proposal to make any one officer a Director of Agricultural Departments and Farms, and we want a highly scientific man who should be competent to be an adviser to Local Governments; but I think it is for this Conference to decide, as far as they can do so, on what points they wish this advice to be given. I think we should be able to determine that after our further discussions, and we will reopen it at a further stage of the Conference when we have discussed our experimental farms and our agricultural teaching. I will read the conditions for success, and assume that they are agreed to, unless any objections are taken to them. Dr. Voelcker writes as follows:—

"Time must be allowed, say five years at least, to see if the plan of having an Agricultural Chemist be a success.

"He must first acquaint himself by travel with the main conditions of Indian agriculture; in other words, he must at first be regarded as a *learner*. Each year a special district might be selected for close study.

"He must be given a thoroughly well-equipped laboratory in a suitable place.

"He should be given a competent Analytical Chemist as resident Laboratory Assistant—a man at a salary of say £600 a year. He must be an *investigator*, not a teacher. The two duties should be separate. The time of an expert investigator should not be taken up for months at a time in teaching Elementary Science at one fixed place when the investigation of some question or conduct of some experiment may require his presence in another part of the country.

"The question of teaching Agricultural Chemistry, whether at Poona or Dehra, could be met by the employment of the Assistant named above, who should, under the Chemical Adviser's guidance, take the classes and direct the study and laboratory work.

"It must be clearly understood that confidence must be rested in such a Chemical Adviser to do the utmost he can to justify the existence and continuance of such a post as he would occupy, and that no Department can lay down lines for the exact employment of his time. To attempt to regulate his work with a view to seeing that his time were fully employed, or that he "earned his salary," would be to put an entire stop on his usefulness as an investigator. The appointment, if made, must be experimental, and time should be given to test its success. If successful, the system may be extended.

"At first such an adviser must be Imperial, not local. Only one such man should be appointed at first; if after trial the advantage of having such a man be shown, the system may be extended to the various provinces.

"Such a man should be paid a high salary—one sufficiently high to secure a first class man, and to ensure his being retained in the particular work undertaken, and not render him liable to drift into any other branch by reason of considerations of "pay."

"Such a man should be entirely paid by Government; he should not be allowed to receive any emolument from private practice as an Analytical Chemist.

"At the same time there need be no reason why investigation should not be carried out by him for any industries, such as coffee, tea, indigo, &c., growing, provided these come to him through Government, and be undertaken at Government's request, and provided he have leisure for conducting them."

The *President*: With reference to the first proposal, shall we specify any time?

The Conference were unanimous in thinking that five years was too short a time, and that it should be extended to seven years.

The following resolution was then adopted :—

Resolution I.—That the first appointment of an Agricultural Chemist should be made for seven years.

With reference to Dr. Voelcker's second suggestion, the Conference agreed to the following proposal :—

Resolution II.—That travel is, for the reasons given by Dr. Voelcker, an essential part of the duties of the Agricultural Chemist, but that it is premature to lay down now any conditions as to the selection of special districts for close study.

The *President*: In connection with the third paragraph, it is proposed that thoroughly equipped laboratories should be formed at Dehra and Poona.

The *Hon'ble Mr. Nolan* agreed that a well equipped laboratory was necessary, but could not see that two were needed, or that Dehra and Poona should be specified as the sites. These stations were somewhat out of the way of all business, and were particularly remote from Bengal. There might be reasons for selection, but he would prefer to leave these to the judgment of the Government of India, as they had no special relation to agriculture. He moved as an amendment that all specification of the site of the laboratory should be omitted.

Mr. Fuller: Is the proposal backed up by questions of economy ?

The *President*: There is a small laboratory at Dehra, and it is arranged that under the new scheme it should afford training to Forest students, admitting native students to higher chances.

The *Hon'ble Mr. Benett*: It will be a school for candidates for Ranger and Sub-Assistant Conservators for the whole of India, and I believe students will come from Bengal and Burma. These men will provide 20 per cent. of the whole of the superior staff all over India. They will meet for three or four months in the autumn every year, and they will have a course of training in Forestry and Agricultural Chemistry.

The *President*: What Dr. Voelcker insists upon in his note is that this man should have a thoroughly equipped laboratory at his service at some suitable place. We require two thoroughly equipped laboratories in two places at present—Dehra and Poona. Calcutta may require one. We are willing (I speak on behalf of the Government of India) that there should be one at Dehra. Therefore the condition asked for by Dr. Voelcker as a condition of success is met.

Mr. Robertson objected to the retention of Dehra, but withdrew his objection on the Hon'ble Mr. Benett explaining that the educational functions of the officer in charge of the laboratory would be extremely useful, and that it is absolutely essential that there should be a laboratory at Dehra. By putting him at Dehra there would be the additional advantage of having him as lecturer at the Forest School.

Mr. Fuller put in the following amended resolution, which was finally adopted by the Conference :—

Resolution III.—That the Agricultural Chemist should be given a well equipped laboratory in a suitable place, and, looking to the desirability of utilizing the services of his Assistant for educational purposes, the Conference agrees that the laboratories should be at Dehra and Poona.

The following resolution, based on Dr. Voelcker's note, was also passed :—

Resolution IV.—That he should be given a competent Analytical Chemist as Assistant. That the Agricultural Chemist should not, but that the Assistant should, be employed in the actual work of teaching.

The *President* considered that in view of Sir James Caird's opinion that the salary offered by the Government of India (*viz.*, Rs. 1,000—1,250) being insufficient, the salary should be left to the decision of the Secretary of State.

Dr. Voelcker: I made some enquiries at home, and I find that any man of considerable knowledge in this branch of science is able to earn a large income by private analytical work. Both in Germany and in England he will obtain a large income.

Mr. Ozanne proposed that the resolution "that the salary of the Agricultural Chemist should be sufficient to secure the services of a competent man and the salary should be left to the Secretary of State" be accepted with the rider "that the Conference as advised is of opinion that a competent man cannot be obtained at a salary materially lower than Rs. 2,000."

The President, Dr. Cooke, and the Hon'ble Mr. Nolan were in favour of Mr. Ozanne's amendment. The Hon'ble Mr. Benett and Messrs. Middleton, Robertson, Hallen, Thomson, Steedman, and Clogstoun voted against it.

Mr. Thomson then proposed the following amendment :—

"That the Conference is of opening that the initial salary should be over Rs. 1,000 rising to a maximum either of Rs. 1,5000 or Rs. 2,000 in seven years."

Mr. Robertson proposed the following amendment :—

"That the Conference think that such a man could be obtained for Rs. 1,200—1,500, but are willing to go as far as Rs. 2,000, if necessary, to secure a thoroughly competent officer."

This resolution was withdrawn in favour of that eventually carried.

Mr. Fuller proposed that the original resolution be allowed to stand with the modification "a really first class officer" instead of "a competent officer."

The following resolution was then carried :—

Resolution V.—That the salary offered for the Agricultural Chemist should be sufficient to secure the services of a really first class man, and that the salary be left to Her Majesty's Secretary of State.

The following resolution was also passed :—

Resolution VI.—That the salary of the Assistant be Rs. 500 rising to Rs. 700 a month.

The *Hon'ble Mr. Benett*: As regards the question of fees, the Agricultural Chemist should not be precluded from taking private practice, but the extent to which he is to be allowed to take private practice ought to be under the control of Government. Government would decide what fees he should take, and how far he should be allowed to be consulted by private individuals. The practical needs of private individuals would be a very good indication of the direction which his investigations ought to take.

In the discussion which followed on this point, the Hon'ble Mr. Nolan and Messrs. Fuller, Hallen, Thomson, and Steedman agreed with the Hon'ble Mr. Benett's views. Drs. Cooke and Voelcker and Messrs. Middleton, Robertson, and Clogstoun disagreed.

The following resolution was then put to the vote, and carried :—

Resolution VII.—That the Agricultural Chemist should be debarred from taking fees under all circumstances.

The *Hon'ble Mr. Nolan* observed that Dr. Voelcker's note contemplated reply to references from Local Governments only on certain subjects, and provided the chemist was at leisure. This appeared by no means sufficient; indeed, no duty of the chemist would be so important as that of giving prompt and full reply to references from Local Governments which would embody the practical requirements of the country on broad questions.

He moved the following resolution, which was adopted :—

Resolution VIII.—It should be the duty of the Agricultural Chemist to give his advice on agricultural questions submitted to him by Local Governments.

The *President* : It is not necessary that we should take up each of these details. I do not know that it is necessary for us to discuss the work to be done at a laboratory.

It was then resolved :—

Resolution IX.—That the Conference express no opinion on the remaining suggestions in parts 'Conditions for success' and 'Laboratory' of Dr. Voelcker's note.

Proceedings of the Agricultural Conference.

Third Meeting, Wednesday, the 8th October 1890.

PRESENT:

SIR E. C. BUCK, KT., *Secretary to the Government of India, Revenue and Agricultural Department.*	President.
HON'BLE W. C. BENETT, *Secretary to the Government of the North-Western Provinces and Oudh.*	Members.
H. F. CLOGSTOUN, Esq., *Commissioner of Settlements and Agriculture, Madras.*	
DR. T. COOKE, *Principal, College of Science, Poona.*	
M. FINUCANE, Esq., *Director of Land Records and Agriculture, Bengal.*	
J. B. FULLER, Esq., *Commissioner of Settlements and Agriculture, Central Provinces.*	
T. H. MIDDLETON, Esq., *Professor of Agriculture, Baroda College.*	
HON'BLE P. NOLAN, *Secretary to the Government of Bengal.*	
E. C. OZANNE, Esq., *Director of Land Records and Agriculture, Bombay.*	
F. A. ROBERTSON, Esq., *Director of Land Records and Agriculture, Punjab.*	
E. B. STEEDMAN, Esq., *Deputy Commissioner, Hoshiarpur, late Director of Land Records and Agriculture, Punjab.*	
R. G. THOMSON, Esq., *Offg. Revenue Secretary to the Government of the Punjab.*	
DR. J. A. VOELCKER, *Consulting Chemist to the Royal Agricultural Society of England.*	
J. W. P. MUIR-MACKENZIE, Esq., *Under-Secretary to the Government of India, Revenue and Agricultural Department.*	

The proceedings were opened by Dr. Voelcker, who on the President's invitation read a paper regarding the principles upon which agricultural experimental stations should be established, and the operations upon them be conducted.

INVESTIGATION BY MEANS OF EXPERIMENTAL STATIONS OR OTHER SIMILAR AGENCY.

The following are the heads of Dr. Voelcker's address. Dr. Voelcker did not wish it to be reported, as it would be embodied in his official report:—

(1) The need of experimental stations or farms.
(2) The supervision required.
(3) Size of farm.
(4) Situation of farm.
(5) Experimental field.
(6) Situation of field.
(7) Kinds of lands suitable for experimental farms.
(8) Setting out the plan of experiment.
(9) Size of plots.
(10) Arrangement of plots.
(11) Advisability, if there is an idea of continuing experiments for any length of time, to have duplicates of all experimental plots.
(12) Selection of manures.

Mr. J. B. Hallen did not attend this and the subsequent meeting.

(13) Space for the extension of experiments.

(14) Recording of abnormal occurrences or features in the cultivation.

(15) Comparison of results.

(16) Cost of manurial treatment.

(17) Cost of cultivation.

(18) Financial success of experimental farm not to be made the criterion.

(19) Care in not starting fresh stations before existing ones have proved a success.

(20) Need of direction and examination of results.

(21) Necessity of patience and time to obtain results on any experimental stations.

The *President*: I will now ask the members of the Conference to make any remarks they would wish on the subjects contained under head 2 (*b*), Investigation by means of experimental stations or other similar agency, in the Conference programme. I think one of the most important points on which we want opinion is regarding the number and size of experimental stations, as it will be necessary to give some sort of idea what the cost of establishing a system of this kind would be. We want to know, for instance, whether the Madras Government scheme of five farms of 30 acres each is sound. The Madras farm schools will be educational institutions, and the farms, so far as they are institutions for enquiry, will be managed by the Director of Public Instruction. The question, I think, will be a suitable one for discussion as to how far it will be possible to set apart a sufficient area for experiments on the system which Dr. Voelcker has advocated, and which he will more formally advocate when his report comes to us finally. From the papers which have been before us, I understand that there are three classes of farms or three functions which they have to perform: one is education, another demonstration for agriculturists, and the third is experimental. One is to be used for school purposes, another in demonstrating results of experiments to agriculturists, and the third for purely experimental purposes.

Mr. Ozanne: Dr. Voelcker has given us a general sketch as to the manner in which we should be guided in experiments, and I think his remarks have been followed by us with great interest, and will be of great benefit. I wish now first of all to say what the Bombay Government has recommended as regards experimental farms, and to show reasons why I personally think that the recommendation should be carried out. We have in the Bombay Presidency only one experimental farm at Bhadgaon. At Poona there is a farm intended to be an adjunct to the Agricultural College so that students may have practical instruction. In Sind there is another farm which is temporarily taken away from the Agricultural Department, because we had no means of supervision owing to the death of one of our Superintendents; but that farm we wish also to revive. But I will read first of all what the Committee appointed by the Bombay Government have sketched out as to their intentions. They write as follows in their report:—

"This brings us to the subject of agricultural improvement. Without anticipating the result of the deliberations of the Conference to be held at Simla in October, we may say that there appears need for establishing experimental farms in the Southern Mahratta Country and in Gujarat, and also, later on, in the Konkan. The principles which have been laid down—*viz.*, that such farms should not be of large area; that the field of experiment should be as small as is compatible with the nature of the experiment; and that, the cost of pure experiment deducted, such farms should be made to pay their working expenses—are sufficient to prevent any extravagant expenditure. The necessity for more farms arises from the necessity of testing results obtained in one locality in other localities, for without this to recommend imitation would be dangerous. The expenditure will consist in the small initial outlay on the purchase of land if Government land is not available, and on the erection of a few farm buildings. And the recurrent expenditure will be only the cost of the Superintendent (say about Rs. 100 to Rs. 150 per mensem) and his clerical staff required to keep the strictest record of the cost of cultivation and outturn. The varying outturn of the staple crops of the Presidency cannot be said to be known with accuracy, and it is thus

highly desirable that the farms should afford the necessary information. While the farms are called on to pay expenses and to show a profit, except on the purely experimental area, it is only fair that the Superintendents should be allowed relaxations of the account rules as far as possible. No farmer can make his farm pay if he is not at liberty to turn his capital over as often as he can do so with profit."

Again they say :—

"To sum up our proposals for agricultural improvement—

(1) The number of experimental farms should be increased.

(2) They should be also cattle farms to breed plough cattle for the cultivators.

(3) They should be used for the purpose of growing pedigree seed for distribution.

(4) As far as possible, they should be adapted to receive apprentices of the cultivating classes.

(5) The Agricultural Department should have a liberal annual grant for the purchase and distribution of seed, whether locally or from abroad.

(6) And a similar grant for the purchase of improved machinery and implements requisite under the present conditions of husbandry.

(7) On this farm and on others the improvement of sheep and goats should, when possible, be studied.

(8) The farms on their non-experimental areas should, in the first instance, grow the staple crops of the locality in the best local method before attempting innovations. The objects should be to thoroughly understand local practices, to try modifications suggested by experience and the principles of scientific agriculture on the experimental area, to test the results of modifications, and, when they prove beneficial, to demonstrate them to the cultivators.

(9) The Agricultural Department should be enabled to encourage cattle and agricultural shows."

The sanction of the post of Superintendent of Farms for the Presidency, which has lately been accorded, will make it possible for the Director to undertake the duties which we have sketched out, and the recommendations of the Committee will at the same time enable him to provide overseers for the farms at a moderate rate of pay.

Then, summing up the reasons for farms and for the extension desired, Mr. Ozanne read the following extract from a representation made by the Poona Agricultural Association :—

"The farms should be not as they are at present, in which the cultivator has scarcely to learn anything, but model farms in the true sense of the word, in which the different operations, processes, raising, reaping, and thrashing of crops and rearing of useful plants should afford to the visitor ocular proofs of the superiority of the methods and the results, and should induce him strongly to try them on his own lands. Every facility and encouragement should be afforded to the agriculturists to visit these farms, and the improved methods of culture should be explained to them. Annual reports of these farms giving results of experiments should be published in vernacular and distributed for the information of the people, and copies may be given as prizes to the children of agriculturists in schools.

"We think the provincial farm should be under the management of a European well trained in the theory and practice of agriculture and horticulture and having Indian experience. He should have one or two native assistants under him educated in Indian agricultural schools, and preferably belonging to the agricultural classes. The zilla farms should be under the management of natives who shall have served as assistants for some time under the Superintendents of provincial farms, and certified to be qualified to have independent charge of zilla farms. We feel sure that by study, practice, and experience natives will in time be able to take charge of provincial farms."

Mr. Ozanne then went on to say this is a general scheme for Bombay, and it will be seen that our so-called experimental farms are, or in places will be, more than experimental farms: in some places partly cattle farms, and in all they would be seed distributing farms, and farms for the acclimatization of seed which has been proved on the experimental area to be wanted in the locality. Therefore I think that the minimum area which Dr. Voelcker has put at 25 acres will of course, as he says himself, have to be modified if other objects than pure experiment are taken up; 25 acres may be sufficient for purely experimental stations, but we have also to consider whether we can justify the necessary superintendence on so small

an area; and as we must have even for small experiments a plot of 25 acres, we must have a man thoroughly competent to supervise. It will be in my opinion very unwise to begin with such small areas as Dr. Voelcker contemplates. We should have 100-acre farms, confining of course experiments to a small area, but utilizing the other area for any purposes it may be best suited. Now, there is one point which I wish to notice, that is, that Dr. Voelcker seems to advise generally that we should not hurry about extending our experiments; that we should wait till the Agricultural Chemist, in consultation with the Director of Agriculture, has completed his enquiry to a further degree, and then put farms when enquiry shows that they are needed. Well, I agree so far as to the general principle. But as on these experimental stations the land will have to be equalized (this work of equalization will take two or three years at least) in beginning our extension now in order that we may have the farms ready for future experiment, I think that we shall not anticipate the advice of the chemist, but that we should prepare for experiments to be begun two or three years hence.

Dr. Voelcker explained that he was not in favour of waiting for the opinion of the Agricultural Chemist before experimental farms were started in the various provinces.

Mr. Ozanne: I will give the definite object in each particular locality. We have the Bhadgaon farm, as to which I need make no remarks. In the Southern Mahratta Country the definite object is to acclimatize American cotton and to test the results of the various cottons and to distribute seed in other parts of the country, because we have already found by experiment that, unless we acclimatize in the Southern Mahratta Country, we cannot use the seed anywhere else, and the proposed farm here would first be a seed farm. Next, as regards the Konkan. Since I have come out, I have been able to make certain experiments with the system of cultivating rice largely confined to Bombay, by which on the seed bed cowdung and other substances are burnt. It is the local system. The localities are very extensive on the whole, and the system is one which comes into direct competition with the Forest Department, and one which the latter very strongly object to. So far we have been able to come to the conclusion that the experiments that I made were sufficient to prove that the system is the best system for the cultivation of rice in certain localities, but it seems to me very essential that these experiments should be continued more carefully and repeated more carefully. They were then done in various areas something like the experiment which Dr. Voelcker mentioned yesterday, which was duplicated in five or six localities. The general result was satisfactory from my point of view. I think that *rab* cultivation, which is so extensive, requires most careful watching and examination on an area which would be purely experimental. That is one of the definite aims, because the trees which the Forest Department desires to conserve are the very ones most used for *rab*. That is one of the most important points. But also in the Konkan I have very strong reason to believe that ensilage may have a very valuable benefit to the country. The rainfall is good, and grass grows very rapidly. I think that by cutting early we may be able to get a double crop, and the first crop may be saved without greatly diminishing the yield of the second one. There are experiments which we can begin now without the help of the Agricultural Chemist. We will want his help later on, when we want to see if we cannot improve on the *rab* cultivation. In Gujarat the reason why I want a farm is that it is by far the most advanced portion of our Presidency, and, strange to say, we know very little about its ordinary cultivation and outturn. But there we also have another definite aim. This farm would be established in a locality where tobacco experiments have been going on for a long time, and very large sums have been spent by private individuals, and it is now time that Government should take up the point where private individuals left off. I have endeavoured here to justify the proposals submitted to the Government of India by the Bombay Government.

The *President*: Do you not consider that any larger number of purely experimental farms are needed ?

Mr. Ozanne: We have already established in the Bombay Presidency agricultural classes attached to High Schools, and each of these little classes has an experimental area (it is educational). These I have not actually tried to abolish simply in the hope that in time we may be able to utilize these small areas as experimental stations in the manner Dr. Voelcker has described.

The *President*: Could you give us your opinion as to the relation of the Agricultural Chemist to these farms?

Mr. Ozanne: My hope is that he will be a man to whom I shall go for help in all difficulties, and that he will help me to carry out the work in a duly scientific manner.

Mr. Middleton: I have listened with interest to Dr. Voelcker's remarks, but I think that detail with regard to the carrying out of experiments should be deferred until we have decided something as to their nature. I have read Circular No. $\frac{143}{77\text{-}4}$-A. containing a summary of the recommendations of the Statistical Conference which the President put in our hands last night, and in connection with what is contained therein, and also with reference to the subjects laid down on the Conference programme, I would like to say something.

Agricultural experiments may be (1) for the purpose of discovering fresh scientific truths or of testing the import to India of theories which seem to be of general extension, and (2) made with the object of ascertaining under special conditions the *value* of some process or crop or manure successful elsewhere. Experiments of the first class deal with such questions as the causes which influence the flavour of tobacco, or the quality of the juice of sugarcane, or the powers of our agricultural plants to assimilate nitrogen and mineral matter. Some such experiments may be undertaken by our Agricultural Chemist at an early date, but for a time India must be content to leave most investigations of this class alone. The expense, the want of a high order of agricultural intelligence to co-operate with the chemist, the probability of better and more paying results where others have led the way may be given as reasons. Experiments of the second class, imitating those of other workers who have been successful, should form the chief part of our programme on Government farms at present.

As our experiments will chiefly be of a commercial nature, cost should be a point for first consideration in planning methods. Obviously, if the prime cost of the improvement is to be considerable, as where manures or better seeds have to be bought, the results must not be microscopic; and, in the first instance, no great expense need be incurred in weighing, &c. A rough preliminary experiment ought to be made, and the Farm Superintendent should judge from it whether or not a detailed experiment should be conducted.

The publication of the results.—It must be confessed that the mere statistics of experiments are very unsatisfactory, and may be misleading to persons unacquainted with local conditions. They are of most value to, and can only be interpreted fully by, the men who make them. For this reason I think that we should ask and expect the men in charge of Government experimental farms to give us the lessons of the experiments they make rather than columns of figures.

From the opportunities his position gives him, the Superintendent of a farm should have a wide experience and an exact knowledge of detail. This being so, his general education and attainments ought to be sufficient to enable him to co-operate with the Agricultural Chemist in the drawing up of reports and the framing of schemes of experiment. We have in India at present no class corresponding to the educated British farmer, but we hope that ere long the Superintendents of farms may be their representatives, for without an intelligent and educated farmer class, the labours of the chemist must be comparatively valueless.

Whilst I approve of Mr. Ozanne's proposal to establish several farms in the Bombay Presidency, I think the salary he names too low to secure the kind of men we require as managers.

I cannot admit that the energies of a man drawing higher pay would be wasted on a 100 to 200-acre farm, because we should not look upon the Superintendents merely as men who have to manage our farms—though this, of course, they will do,—but rather on our farms as stations on which to educate agricultural experts. The knowledge we want in these experts will be better gained by the close study of one small farm than by the rapid survey of larger districts; for in agriculture it is the man who has a complete knowledge of one place—not he who knows the district generally,—whose opinion is of practical value.

In Britain few men who farm more than 2,000 acres of arable land are commercially successful, or are noted for their skill in any particular branch of agriculture. The very best farmers are found amongst those who, though possessing the capacity and capital of men cultivating larger areas, confine themselves to a few hundred acres of land. This I think points very plainly to the conclusion that farm and farmer are alike benefited by attempting little, and by doing that little well. At the same time I think it would be a pity to limit the Government farms to the 25 acres Dr. Voelcker says would be enough for experimental purposes.

The Superintendent could manage 100 acres more without loss to Government and with profit to himself and to the cause of agricultural enquiry, for the whole farm would be to him experimental in the same sense as his holding is to our best type of British farmer.

To limit the farm to 25 acres would take away opportunities for the getting of experience which the Superintendent might otherwise enjoy.

If we employ inferior men on a low salary to manage farms, they may conduct experiments carefully and submit accurate figures giving the results; but these figures must be analysed and the conclusions drawn up by others. Instead, I should prefer to have highly qualified Superintendents, so placed that they themselves might learn as much as possible—men whose practical knowledge of agriculture could be relied on by Government, and who would not only carry out experiments, but, in conjunction with the Agricultural Chemist, would record the lessons of the past and indicate lines of action for the future.

Dr. Cooke had no remarks to offer.

Mr. Robertson: I should not have had much to say on this subject, as we have no experimental farms in the Punjab, had it not been for the note at the end of the Conference programme which runs:—"Local Governments have been asked to send their delegates provided with a definite scheme for agricultural experiments for discussion at the Conference." I have received no such instructions from my own Government, and I hold no commission to represent that Government, but under the circumstances I wish to make a few remarks.

It may be assumed that experimental farms should by their results justify the expenditure upon them. In one of the last despatches from the Secretary of State, it is distinctly laid down that any large expenditure on agricultural experiments is not to be incurred in the future. When such farms are already established the case is different, but it seems to me that in reference to places where they have not yet been in existence, we are a little putting the "cart before the horse." We have just decided that it is desirable to have an Agricultural Chemist in this country, one of whose principal functions will be to advise on the general arrangements and management of such experimental farms, their size, and the manner in which experiments should be started and conducted on them. This being so, I think that where no farms now exist, it would be best to wait for the advice of this expert before incurring expenditure on the establishment of an experimental farm.

Subject to all correction, I am bound to confess that from all I can learn I do not think that the actual practical results of the experimental farms which have been tried in various provinces have as yet been at all commensurate with the expense incurred. This is, I think, the experience of the past: let us hope the experience of the future will be different. There is to my mind a very

suspicious sound about such an expression as "the farm must be large enough to justify the salary of the Superintendent," and it is a curious remark to make that a farm has paid its expenses when the whole cost of the Superintendent's salary, perhaps the chief item of expenditure, is excluded from the calculation. But I lay little stress on this, because I think experimental farms cannot be expected to "pay" in the ordinary commercial sense.

One great difficulty, especially true of the Punjab, is that the results which may be arrived at on an experimental farm, and which may be perfectly sound for that farm and its immediate neighbourhood, are utterly valueless for totally dissimilar tracts of country 50 or 100 miles away. If our experiments, therefore, are to benefit the Province generally, we must very much extend our operations. I think a number of rough experiments made in various parts at the same time through zamindars and district officials are likely to be useful as indicating the lines upon which more careful and scientific experiments might be made. I think too that heretofore a good deal has been attempted in the direction of high scientific experiment without the necessary knowledge and experience. Speaking for myself only, I would like to have the advice of the agricultural expert before submitting any scheme for experimental farms to my own Government for the Punjab. I think myself that we ought to do something in that direction, but not in the way of large and expensive experimental farms. Several small experimental stations would probably be more useful. Cattle-breeding is a totally different matter, and should not, I think, be attempted on an experimental farm, but, if attempted at all, should be an entirely separate undertaking. Thus, while agreeing that we should do something in the direction of agricultural experiment, I think we should pause till we have further advice before embarking on increased expenditure. Those provinces which already possess experimental farms will no doubt continue to make good use of them, but we should not be in too great haste to establish new ones, and, when we do so, we should be very careful that we are doing so on the right lines.

The *Hon'ble Mr. Nolan* desired to pass over the first four points specified in the programme under heading B as forming matter more suitable for comment by Mr. Finucane, observing only that he hoped centralized control would be confined to the scientific experiments tried at the farms, leaving Local Governments and Directors a free hand in regard to demonstration and tuition. The sixth topic, "Measures for widely disseminating knowledge acquired at farms," might, he thought, be extended to include useful information acquired in other ways. The farms had justified the moderate expenditure incurred on them, but progress had come mainly from the people themselves—that is, from the ablest of those engaged in practical agriculture. The most useful work of the Department consisted in extending to the more backward districts methods already proved profitable in the more advanced, as the cultivation of jute, the use of the Behcea and other sugar mills. Experiments by private individuals had been spoken of with scant respect, but after all this had been the source of all improvement in the past. Every effort should be made to publish the results obtained on the more prosperous farms or plantations, with which object agricultural exhibitions were to be encouraged. In regard to greater liberality in grants for special expenditure, much depended on the provisions made in the Provincial contracts which would come under revision in the ensuing year. The difficulty lay not in devising projects for increased expenditure, but in getting the money. In Bengal at least there were no funds at present available for the purpose; even popular education, which might be regarded as one of the necessities as distinguished from the luxuries of administration, had to be restricted for want of funds.

The *Hon'ble Mr. Benett*: I regret to say that I have not been favoured by my Government with any instructions on the subject.

Mr. Fuller said that experimental farms were, of course, not the only means of effecting improvements in agriculture, but that they were certainly one of the means for this purpose, and a reasonable expenditure of money on their maintenance was justified. It might be that hitherto not many positive results had been obtained. But the experiments had often been of the very greatest use

in proving a negative. Government has constantly been urged by theorists to embark on some project of improvement which careful experiment had shown to be unsound, and by doing so had saved the Government from wasting large sums of money. Then there was another consideration which made a farm an almost indispensable adjunct to an Agricultural Department. It was admitted that careful enquiry into existing processes must precede the suggestion of improvement. Now in his opinion the maintenance of a farm was necessary to such enquiry, as without it the officials of Government would never obtain a sufficiently practical acquaintance with the agriculture of the country to enable them to sift the information they acquired, or indeed even to acquire information. It was exceedingly difficult to extract information from native agriculturists unless the enquirer started with some practical knowledge regarding the subject of his enquiry. Information had to be collected in shreds, and the shreds then pieced together. In enabling a man to collate information gained from different quarters, the practical lessons which a farm afforded were of very great advantage. Mr. Fuller agreed with Mr. Ozanne in thinking that from this point of view it was inadvisable to restrict the size of farms to a very small area. He quite agreed with Mr. Middleton as to the absolute necessity for really good supervision. He understood from Mr. Middleton that it was as difficult in England to get a really competent Farm Superintendent as it was to find a native qualified for the post out here. Government could never expect to get really competent Superintendents for a number of farms, and this made the appointment of an Agricultural Adviser a necessity, if farm operations were to be conducted with uniform efficiency. Such an official could visit farms each year, examine the scheme of experiments and the method in which they were conducted, and give advice which would be of immense assistance. Again, the appointment of an Agricultural Adviser would secure the proper criterion of experimental results. There had been very little effective criterion in the past, and experiments had suffered from its absence. Experimental farms might often be usefully made use of for educational purposes. This was the case with the Nagpur farm, and afforded an additional justification for its existence.

Mr. Thomson: As Mr. Robertson has called attention to the Note II-B. in the programme, and as the Hon'ble Mr. Benett has also noticed the absence of instructions from his Government, I think it advisable to recall attention to the fact that the officers from the Punjab here represent no one but themselves, and that they are in no way delegates of their Government. I do not think that the results of experiments at farms or stations will be of any practical use unless they are capable of application to the general cultivation of the country. To make attempts with manures which the ordinary farmer cannot procure, or with implements which he cannot purchase, is labour and time thrown away. Similarly, experiments on small plots differentiated by numerous special conditions are clearly of such limited application, and require so much intelligent explanation before they can be applied at all, that their usefulness is evidently very small. They are at best indications for further experiments, and not in themselves positive results. We can never argue from results on small plots of special character, and under special conditions, to the general promise on ordinary village fields. The only useful practical results we can hope for therefore are results from large farms under ordinary zamindari conditions. Such results on a really useful scale we are not likely to get, and I therefore think that we should restrict our Government attempts to purely scientific experiments, such as the introduction and acclimatization of new staples on small plots or experimental gardens. For general agricultural improvement, I think we should trust to the people themselves, at any rate for the present. The difference between different villages in agricultural knowledge and practice is often enormous, even in the case of villages in near proximity to one another. These differences are certainly much greater than between our experimental farms and good zamindari villages. I therefore think that we should attempt to use the good villages as schoolmasters for the bad. Here we secure identity of circumstance under absolutely practical conditions, and we are more likely to achieve useful results than in any other way. I do not, however, expect much even from these methods, and I demur altogether to large expenditure on Government farms or experimental stations.

Mr. Steedman: The question before us is investigation by means of experimental stations or other similar agency. The discussion was commenced by Dr. Voelcker laying down the general principles for the conduct of investigations. I am not able to give an opinion of much value on the points noted by Dr. Voelcker. The question is one for experts. But I hardly think it is within the province of the Conference to discuss the general and detailed principles laid down. No doubt they will be extremely useful to officers in charge of farms or to the Director starting the experiments.

I think that in discussing this question, we have to look back to past experience, and I notice the Madras Government in the Resolution they have recorded on the Agricultural Committee's report write as follows:—

"It will be seen from the foregoing summary of the Committee's investigations that the amount of real good secured by all the efforts of the past has been infinitesimal, and that the greater part of the money which has been spent on agricultural improvement and education has been wasted. With the best intentions on the part of various Governments, all endeavours to advance practical agriculture have failed, and the only result of the operations of the Department has been the awakening of an interest which possibly might have sprung up independently."

Again, Mr. Fuller in his note on Agricultural Improvement says:—

"Successful experiments have been made with a number of novelties, such as ensilage; but the only practical result which the farm can claim in this direction is the acclimatization and introduction of a new variety of cotton which has found some favour with cultivators in the Wardha District.

"The farm has been of use in adding to our knowledge of the produce of the land, and now fulfils a most useful educational purpose as a practical training ground for the students of the agricultural class."

As Director of Agriculture in the Punjab, I studied reports on the Cawnpore farm and others, and I must say that what struck me in respect to experiments was that there was a want of practical object about them. I think that all experiments should have a direct practical object, and that our efforts should be restricted to experiments the results of which, if successful, are likely to come within the reach of the average ryot of the particular province. For instance, what is the good, as Dr. Voelcker pointed out, of conducting elaborate investigations with reference to the use of shoddy? The Hon'ble Mr. Nolan has said that there will be no serious improvement except such as comes from the people. I do not think in the Punjab, where we have such a large number of small peasant proprietors, we are likely to get any direct improvement from them. I think the people to whom we are to look are the larger landowners.

Mr. Clogstoun: The Madras Government proposes at once to have five small farms attached to five agricultural schools to be opened at the headquarters of five of the principal districts. In these farms the different processes of agriculture will be taught to the students, but they will also be utilized for purposes of experimental cultivation, and, where processes are successful, they will be used as farms of demonstration. They will also be of very great assistance to us in enquiring into native systems of cultivation. Our proposal is to have 30 acres of land round each farm, and to cultivate the crops which the ryots themselves cultivate; ryots will be hired themselves to cultivate, and we will try our improvements side by side on the staple crops of the district. The experiments which we propose to try immediately, and the improvements in processes of culture which can be at once demonstrated, may be seen from paragraph 34, page 8, of the Madras Agricultural Committee's Report. I have already referred to them once or twice. They are as follows:—

"(1) The results of shallow tillage, especially in years of drought, and the prophylactic effects of deep tillage; (2) the thorough tillage rendered possible with a moderate rainfall by reason of the rapidity in action of improved ploughs; (3) the crop results, especially in years of poor rainfall, from the power to utilize scanty rain to the best advantage by the rapidity of the improved ploughs; (4) the use of the country seed-drill as effecting a probable saving in seed, and permitting economical after-cultivation; (5) the possibility and effects of cheap green-manuring upon dry soils deficient in humus; (6) the proper management of customary manures, the use of neglected manures, and the possibility of growing cheaply green-manure for wet lands; (7) the results of new seed; (8) the causes of low produce, and the proper

methods in the cultivation of cotton, cereals, and general produce; (9) ensilage; (10) the better manipulation of wet lands, especially in the matter of the subsoil and use of water; (11) the ploughing of land immediately after harvest, whether on wet or dry lands, to enable the growth of a catch-crop or a thorough fallow; (12) the better management of cattle in health and disease, including the growth of fodder crops, hedges, trees, and shrubs. The possibility of improvement in these practices is indicated both in the extract from Mr. Benson's reply to the Famine Commission contained in paragraph 37 of Appendix C and in his examination before this Committee on the 20th March (Appendix J, pages 262 and 263 *in fra* of the Agricultural Committee's Report)."

There do not seem to be any of these experiments which Madras is not able to carry on without the aid of the Imperial officer, and the proposal to require the sanction of the Imperial officer to the conduct of such experiments seems unnecessary. We have got Mr. Benson, who is a graduated Assistant, and who has been at the Saidapet farm for the last 12 or 15 years. The failure of the Saidapet farm has been alluded to, and Dr. Voelcker argues from it that it is unwise to extend experimental farms. But Saidapet was situated in a "hole and corner" of the district; and, as Dr. Voelcker has admitted, it was composed of infamous soil on which nothing would grow, and, if anything did grow, we were not in a position to show it to the ryots. Where we should want the aid of the Agricultural Chemist, the Imperial officer referred to above, is particularly shown in the letter of Mr. Gill * regarding the cultivation of sugarcane. He has made a large number of experiments to test the yield of sugar (he is Manager of one of the great sugar factories), and he finds that they vary very much indeed; and he also points out that if we do not take measures to improve the sugar cultivation and introduce the canes which give the best sugar, the cultivation of sugar in India will be driven out by the importation of German-grown sugar. The Agricultural Chemist might very usefully be utilized in making experiments as to the yield of sugar and sugarcane, and even that single experiment would, in my opinion, justify the appointment of an officer. In further justification of small farms of 30 acres each, I would refer to Mr. Benson's opinion, which is given at page 254 of the Agricultural Committee's report. As regards superintendence, he suggests that each of the five farms be headed by a man who has been educated for two years at the Saidapet College, and then, in reply to an enquiry of the Committee, he says:—

"If the farms were my own private property, I would be content to start them under the above Superintendents if under due supervision."

The cost of working would be Rs. 10 per acre per farm. There is nothing on the ground of expense to prevent these five farms being established. I think the proposal of the Madras Government to start these farms at once is a very suitable one. There is one other experiment I would like to refer to. As Commissioner of Settlement, I am just now reassessing the Tanjore District. It is very rich, and grows nothing but rice. We propose to increase the assessment by about 15 lakhs; but if the lands yield as they ought to, and as the lands in the neighbouring district do, we ought to get another 15 lakhs. We are losing 15 lakhs a year, and the ryots are losing an equal amount. In manure and cattle it is exceedingly poor, and we propose to try an experiment in the way of growing a green crop and ploughing it in. The superiority of the land in the neighbouring districts is due mainly to the fact that they manure with the leaves of the wild indigo.

Mr. Finucane: I agree with what the Hon'ble Mr. Nolan has said that the extension of experimental stations is entirely a matter of money. There is no difficulty in indicating ways in which improvement and investigation can be made, but it is entirely a question where we are to get the means to make that investigation? I read the following extract from my report to the Bengal Government on agricultural enquiry and improvement:—

"It appears to me that the direct action of Government in the introduction of changes in the agricultural practices of a country like India cannot at best have any great effect for many years to come unless and until Government is prepared to expend very much larger amounts on this branch of administration than it is at all likely to spend, or perhaps than it would be justified in expending, in the permanently-settled districts of Bengal. It has been already stated that where primary education is spreading and intelligence is awakened by communication with the outside world, and reasonable security of tenure prevails, there

* *Vide* Government of India Circular to Local Governments, No. 21-A., dated 28th July 1890.

cultivators do not want only to waste the manurial resources at their disposal, and are even resorting to artificial manures. Where, on the other hand, as in Behar and Chota Nagpur, the body of the cultivators are ignorant and the tenure of land is insecure, there cultivation is backward, and attempts to introduce improvements are, and will be, futile. The cause of this poverty and backwardness in the latter instances appears to me to lie more in the ignorance of the cultivators and in the apathy entailed by insecurity of tenure than in the number of the population pressing on the resources of the soil. For this reason, I am of opinion that it is of cardinal importance in connection with the question of improvement of the agricultural practices of the country that primary education should be spread, and that reasonable security of tenure should be guaranteed. But while thinking that spread of education and security of tenure will ultimately have more effect on improvement of agriculture than any direct efforts of Government by way of encouragement of improved practices shown in experimental farms to be beneficial, or by farms, agricultural shows, or the like, I am at the same time of opinion that much may also be usefully done at a moderate cost in the latter directions.

"It is obvious that without some sort of agency possessed of an agricultural education and training, it is impossible for an Agricultural Department to effect any substantial agricultural improvement, and it seems equally obvious that, given such educated and trained agency, it will be impossible for Government to reach the masses of the agricultural community in the matter of agricultural improvement unless the sympathies are enlisted of those who are looked to by the cultivating classes as their natural leaders. Bengal at present stands almost alone in being absolutely without the means of imparting agricultural education and training of any kind, either to the servants of Government who may be employed in the agricultural Department and in the management of estates, or to the sons and agents of zamindars and cultivators who may be desirous of such training and education. It appears to me to be eminently desirable that the means of imparting such education should be provided, for there is no part of India in which there is more likelihood of such education and training being appreciated, and subsequently taken advantage of. Bengalis have surpassed the inhabitants of other provinces in other walks of life, as pleaders, doctors, engineers, and there is no reason to suppose that they would not take advantage of opportunities to acquire and make use of a knowledge of agriculture, and of the sciences connected with it, if such opportunities were placed in their way. Those who maintain that agricultural education is useless, and that the ryots' practice admits of no improvement, are consistent in refusing the means of an agricultural education; for if such education leads to no useful results, then the Bengali will not be slow to find this out; but for those who believe that existing practices are susceptible of improvement with profit, it is difficult to overrate the importance of imparting to the better-to-do classes connected with land an agricultural and practical education which will divert their minds from chimerical literary and political pursuits, and give them important practical subjects on their own estates, on which they may interest themselves. Proposals have already been made for the establishment of an Agricultural College or School at Seebpore at a moderate cost. I would take this opportunity of renewing and inviting attention to that proposal.

"The proposals made for imparting education of a high character to Bengalis and others at Dehra do not affect the necessity of having an agricultural school at Seebpore, for the education at Dehra cannot be agricultural, and, even if it were, I do not think that Bengalis will go there. Attached to the agricultural school at Seebpore it is necessary that there should be an experimental station, where well-devised experiments may be carried on with scientific accuracy, and a demonstration farm in which the students may take a part in the actual work of farm operations.

"In addition to the higher class of agricultural education provided in the proposed College, elementary instruction may be given in primary schools. An Agricultural Primer has lately been adopted as a text-book in these schools.

"Over and above the Agricultural College, and the experiments conducted in the station attached to it, experiments should be conducted under skilled supervision in the various parts of the country of which the soil and climate and systems of cultivation are broadly and distinctly different from those prevailing in Calcutta and its neighbourhood. The requisite for the proper conduct of these experiments are:—

1st—The sites of the experimental station should be so selected that they may be typical of as large areas as possible.

2nd—The soil of the various plots on which experiments are made at each experimental station should be uniform.

3rd—The experiments should be devised with a definite object after enquiry into the system of agriculture practised in the locality, and they should be made with a view to the introduction of definite and practical improvements if the experiments show profitable results.

4th—They should be carried on continuously for a number of years on the same plots.

5th—The soil should be analysed.

"With the establishment at present available, I do not think it desirable to open any new experimental stations. The three small stations already established are quite as much as can be

supervised by the agency now employed; but if funds were available, and this agency were strengthened, it would, in my opinion, be desirable to establish additional experimental stations in Eastern Bengal, Orissa, and Chota Nagpur. Provision should be made for the permanent retention in the Agricultural Department of the officers engaged in the supervision of experiments, and their number should be increased."

Mr. Finucane continued: I am strongly of opinion that greater liberality is requisite in grants in Bengal mainly for agricultural education leading up to a University degree, and also for the moderate extension of experimental stations; and that these stations should in Bengal be supervised by the Cirencester graduates, whom I have found to be most practical supervisors. But it is absolutely necessary that some arrangement should be made under which these graduates are to be permanently retained in the Department. The Agricultural Chemist or Adviser would, as a matter of course, be most useful in criticising, directing, and advising on the experiments conducted under the immediate supervision of the Cirencester graduates.

The *Hon'ble Mr. Benett:* In my opinion the Cawnpore farm has been in many ways a very useful institution to Government, and there is not, as far as I know, any intention of closing it or modifying its constitution. For one thing it has been useful in providing a cheap method of demonstrating the utility of various agricultural processes to outsiders. The farm has also provided an admirable basis for conducting all sorts of experiments. The only question is whether they can be done cheaply enough to repay cost. Another useful thing we have done is in the collection and distribution of great quantities of seed. I have no doubt that the agriculture of the Province has improved by the varieties of seed which it has sent broadcast all over the Province. The seeds are paid for by agriculturists, and cost nothing to Government. The farmers have to find out what the best sorts are, and give them notoriety. There is no doubt that the farm has been useful for creating an interest in agricultural improvements. We have a society of three or four hundred members, all men of intelligence and good position. They collect in large numbers, and are always paying visits to the farm and watch the experiments with interest. It is advantageous even to create the idea that experiments can be made and improvements are possible. For all these reasons, I think that the Cawnpore farm has done very good work indeed. It certainly, however, has failed in the matter of continuity of experiments. These experiments promised well under the direction of Mr. Fuller; and if he had remained there, the results would no doubt have been as good as at the beginning. Since then there have been all sorts of people, each with different ideas; and experiments, I am afraid, are not of very much use now. But if we had an Agricultural Chemist, his services would be invaluable in giving continuity to these experiments by reviewing the Director's report on the experiments in the farm. He would compel the Director to keep to one line. He would visit the farm too, and give him guidance in that way. I think the farm hardly can be of much use as an experimental station unless it has a thoroughly good practical Agricultural Chemist to give a direction and consistency to experiments which are carried on. This is absolutely essential. Another use is in connection with education. My idea of agricultural education is that the only way by which you can get people to take it up in any numbers is by attaching it to the University Course. I hope we may get a large sum of money from private contributions to establish an agricultural branch in Science which will lead up to the B. A.; and perhaps to get out a professor or two—one to be attached to the Muir College. This man will teach the agricultural classes. But they will want a practical farm to give point to their instructions. The farm at Cawnpore may be made extremely useful as auxiliary to the instruction given at the University; and, if it is too far off, it would probably be possible to start small demonstration areas wherever a College may be—say, one at Lucknow and another at Allahabad. The Cawnpore one may be used in that way; students might be sent there. I think a great deal is to be said for keeping up the farm, and at the same time I think that, from an experimental point of view, it is not likely to be of any real service unless we have the services of a good Agricultural Chemist.

The *President:* I have a few remarks to make on what has been said to-day. I wish to explain that in taking up this section (B-II) on the system

of experimental farms, we are practically dealing with Dr. Voelcker's suggestions on the subject, which suggestions he has made in accordance with the desire of the Secretary of State that he should visit India in order to advise the Government of India upon the best course to be adopted for the teaching of Agricultural Chemistry and for effecting improvements in Indian agriculture. I think that I agree with Mr. Steedman that it is premature for us at present to attempt to lay down or to accept any final system or programme for the conduct and method of experimental farms; but I think that sufficient has been said to show that there are many points on which the members of the Conference are in agreement, and therefore that these points of agreement should be formally put forward and expressed. Also it is very important that the Conference should declare as positively as possible their opinion as to the utility of an Agricultural Chemist in connection with whatever system is finally adopted for experimental farms. There is no doubt that each province should be, as they must be, allowed a considerable latitude in their own provincial arrangements; but there are certain general principles which it would be as well that all should commonly adopt in carrying out these provincial experiments, and it is in introducing and maintaining the application of these general principles that I think an Agricultural Chemist is so much wanted, and I understood that to be the feeling of the Conference from the various statements made to-day.

I am, as you have all expressed yourselves to be, very much obliged to Dr. Voelcker for explaining at such length what his opinion is as to the system of experimental stations which should be adopted. We have now further to consider the scientific section of the work (*i.e.*, purely scientific) and the corollary, demonstration farms. I think that I should review what Dr. Voelcker has said with reference to the headings given under II-B of the programme. We can only say that the general opinion is that there should be a certain number of experimental stations in each province. That has been practically accepted in some provinces by the establishment of such stations, and we are not prepared to lay down any definite rules as to size and number. As to the system of management and control, I think we are all agreed with Dr. Voelcker that they must be controlled by competent experts; also that the work controlled by these competent experts should be further regulated and supervised by the visits of the central officer, and that the objects to which the experiments should be restricted should be regulated also under his advice. It is unnecessary for us to state now what these objects should be. The use of farms for seed growing agencies may be left as outside the present subject of discussion.

Measures for securing continuity.—This, I think, the most important of all. I agree with what the Hon'ble Mr. Benett said on that point that many useful experiments were begun at the Cawnpore farm, and they would have been continued, I am convinced, if the system adopted on that farm, and the reports sent in from that farm, had been brought under the supervision and direction of some central official. He would have brought to the notice of the Local Government on what points and in what directions experiments that had been begun were likely to fail from want of continuity, and his reports would, I am convinced, have had great effect in securing the desired continuity. There is another point, I think, on which we much want the criticism of some first class competent referee. That function can only be fulfilled by an officer of the kind for whom we have asked the Secretary of State. Another very important function which this officer would have to perform would be to assist in disseminating knowledge not only acquired in science, but existing in one province, which does not exist in another. I am glad to find several officers have given evidence on this point. Mr. Ozanne has told us that he has got cotton seed most likely to be useful in some Bombay districts from Berar. It is an accident Mr. Ozanne's visiting Berar, as it is not the function of an officer to travel in another province. Now the officer whom we now desire to obtain will obtain in one province all information regarding the system of the agriculture of the country and the experiments being tried, and it will be a natural function of his to carry from one province to another the last results of successful experiments. Mr. Finucane gave us an example of a practice which exists in one part, and which may be applied

to another, but which for want of carrying agency was not done. In connection with his functions as disseminator of knowledge, we ought also to expect from an agricultural adviser some general publication in which the public as well as Government officials and the Agricultural Departments would receive information of all that may be useful in connection with the information that he has received during his tours and from reports that he reviews, and in connection with the encouragement and utilization of experiments of private individuals. I think there is no doubt that during his tours an officer such as we contemplate would by degrees acquire the confidence of the farmers and private experimenters, if you can call them so, in the various provinces with whom he will confer, and to whom he will give very valuable advice, as well as to Government officials. These are points, I think, in reviewing the headings under this section, in which it is patent from the evidence received to-day and from what has been said that the Agricultural Chemist is, if we are to undertake any attempt to improve agriculture at all, a necessity. The primary function of this officer in connection with experimental stations will be to establish, in communication with Provincial Governments and Provincial Departments, the system, or so much of the system as Dr. Voelcker may put forward, as that which he considers as primarily suitable to the country. Dr. Voelcker's proposals, so far as the purely scientific sections of the farms are concerned, do not appear to me to be prominently at variance with the general views expressed by any officer here present; but, so far as they may be so, those minor points of difference would be settled in the course of communication with the officer who comes to the country, and a satisfactory scheme could be arranged in accordance with the rules and orders of the respective Governments and with the wishes of the provincial officers. The point which, I think, we want to lay stress on in bringing forward our application for an Agricultural Chemist and his Assistant is that experimental farms of a scientific character, and requiring scientific supervision, are a necessary adjunct to the education of the people in agriculture. Mr. Finucane, I think, made some remarks on the subject of education in connection with experimental farms, saying that experimental farms would be of no use until the people were educated, or rather that education was the chief necessity in aiming at agricultural improvement; and I understand Mr. Finucane to say that education is to be our primary aim in agricultural improvement, and experimental farms occupy a subordinate place to the primary end of education. As I said in my opening remarks, we must educate the people to effect their own improvements, but at the same time we should establish a system of experimental farms side by side with their education, so that as they become educated they might have some sort of results to look to which they could at once apply; and in connection with those remarks, I think the Hon'ble Mr. Benett has confirmed that view of the subject in saying that the experimental farm which was established for some years in Cawnpore has had a very decided and marked effect in inducing interest in experimental work. I may assume that the Conference consider unanimously that experimental stations, the method of management and control of which may be settled hereafter, are, if we are to undertake agricultural improvement at all, a necessity, and that, if such experimental stations are established, it is equally necessary that there should be some officer competent to perform those functions which I have enumerated. As I have said in my present address, in the first place we must have experimental stations, and, in the second place, that if these experimental stations are to fulfil the objects for which they are established, we must have superior supervision. These are the results which I draw from what has been said to-day, and I would ask whether the Conference think it desirable to frame any resolutions to that effect, or whether it will be sufficient that what has been said be put on record.

The Conference then passed the following resolution:—

"That if any attempt is to be made by Government to further agricultural improvement, it is highly desirable to maintain in each province a system of farms for enquiry and experiment; and that for the proper conduct of them, for securing continuity of enquiry, and for communicating information to officials and the public, the services of a competent adviser of the character recommended at the meeting of this Conference on the 7th instant is indispensable.

Proceedings of the Agricultural Conference.

Fourth Meeting, Thursday, the 9th October 1890.

PRESENT:

SIR E. C. BUCK, KT., *Secretary to the Government of India, Revenue and Agricultural Department.* } President.

HON'BLE W. C. BENETT, *Secretary to the Government of the North-Western Provinces and Oudh.*

H. F. CLOGSTOUN, Esq., *Commissioner of Settlements and Agriculture, Madras.*

DR. T. COOKE, *Principal, College of Science, Poona.*

M. FINUCANE, Esq., *Director of Land Records and Agriculture, Bengal.*

J. B. FULLER, Esq., *Commissioner of Settlements and Agriculture, Central Provinces.*

T. H. MIDDLETON, Esq., *Professor of Agriculture, Baroda College.*

HON'BLE P. NOLAN, *Secretary to the Government of Bengal.*

E. C. OZANNE, Esq., *Director of Land Records and Agriculture, Bombay.*

F. A. ROBERTSON, Esq., *Director of Land Records and Agriculture, Punjab.*

E. B. STEEDMAN, Esq., *Deputy Commissioner, Hoshiarpur, late Director of Land Records and Agriculture, Punjab.*

R. G. THOMSON, Esq., *Officiating Revenue Secretary to the Government of the Punjab.*

DR. J. A. VOELCKER, *Consulting Chemist to the Royal Agricultural Society of England.*

J. W. P. MUIR-MACKENZIE, Esq., *Under-Secretary to the Government of India, Revenue and Agricultural Department.*

} Members.

AGRICULTURAL EDUCATION.

The President opened the meeting with the following remarks :—

GENTLEMEN,—In opening to-day's meeting of the Conference, I desire to make a few preliminary remarks, as I consider that the subject which we are to discuss this morning is the most important of all with which the Conference has to deal, and it has been satisfactory to learn from the allusions which have already been made to agricultural education by many of the members present that the Conference is disposed to share in this view.

It was implied in the remarks with which our first meeting was opened that the Agricultural Departments, Imperial and Provincial, in 1881 were charged with a serious duty by Her Majesty's Secretary of State, *viz.*, that of securing, as far as possible, the development of agricultural improvement. I may go further and say that this duty was imposed upon them by the people and Parliament of England, for the instructions which were received nine years ago from the India Office were the outcome of a Commission appointed from home for the purpose of deciding what measures were necessary for placing the agricultural system of India upon a more secure footing.

I have already explained why, until the Agricultural Departments should have established themselves as a financially useful section of the administrative organization of the country, serious consideration of the policy which should guide any attempts at fulfilling the special duty with which they were charged should be postponed. But the time has now come at which its fulfilment can no longer be deferred, and in dealing with the question of providing India

with an agricultural expert of first rank, we should take the opportunity to give strong expression to our opinion as to the general policy which underlies that measure, and of which it only forms a subordinate part.

In 1886 I considered it desirable to place on record my own views on this subject; and although the note which was then written has not been officially published, yet the principles which were formulated therein formed the basis of the recommendations which were made to Her Majesty's Secretary of State in connection with the appointment of an Agricultural Chemist. In referring to that part of the recommendations of the Famine Commissioners endorsed by Her Majesty's Secretary of State, that the introduction of measures for agricultural reform was to be the special duty of selected Government officials, the following remarks were made in my note of 1886, which I will now ask your permission to read, hoping that the length of my quotation will be considered to be justified by the importance of the subject.

Before reading them, however, I would ask that it may be borne in mind that when the note was written the country was suffering under financial difficulties which do not now seem likely to recur, and that the system of education necessary for the improvement of the agricultural classes need not be subjected to the extreme financial starvation which was contemplated as imperative at a time when we, in common with all Governments and Departments, were commanded to reduce expenditure to the very lowest limits. I would also remind the Conference that since the note was recorded a new obligation has been placed upon Agricultural and Educational Departments to give serious attention to, and to take positive measures for, the education of the rural classes in the direction of agriculture by the Resolution on Technical Education issued in 1888 by the Home Department, from which I will make important quotations at the conclusion of this address. The extract from my own note of 1886, which I ask permission to read, is the following :—

"My views on the policy of a State Agricultural Department have recently been to some extent modified by the enquiries which I have made on the Continent in respect to the agricultural institutions of France, Italy, and Germany. I may specially instance those of Italy, where I visited the Agricultural Colleges at Portici (near Naples) and Milan. I found that after some years of experiment the idea of teaching farmers at these colleges appeared partially to have broken down, especially in the south of Italy, where the land proprietors were small and without capital. The conclusion at which the authorities appeared to have arrived was that the direction in which State influence could be most usefully employed was in that of education. Nearly every student at Portici, and a great number of those at Milan, were destined to be village schoolmasters, through whom elementary instruction was to be conveyed to the rising generation of peasant proprietors in the country villages. The Imperial policy might take in India a similar direction. We have an enormous educational machinery already at work in teaching to the masses of the agricultural population, who have to gain their livelihood by agriculture, everything else in the world except agriculture, and that which has to do with agriculture. The agricultural element is practically eliminated from the educational course. Now and then an Agricultural Manual, generally written by some amateur, is translated and circulated as a text-book, but the village schoolmaster, who gives it to his pupils to read, is just as ignorant as they are about the subject with which it deals. What I would suggest is that, without any material addition at present to the cost of the administration of the country, we should substitute agricultural instruction for a certain section of the educational programme as it now exists, and that we should at the same time cut down, or at any rate curtail and repress, expenditure on agricultural experiment. In this way we should without considerable cost perform the national duty, from which no Government of India can escape, of laying some foundation for future agricultural progress. The immediate step to take is that of educating teachers. There seems no reason why for some few years to come the teaching need be of a very high class or standard, but it must be sound. A preliminary step that might be taken would be to utilise those natives who have received, or may still be allowed to receive, an education at Cirencester for the instruction in agricultural subjects of the candidates for village schoolmasterships, or for the instruction to all, even of those village schoolmasters now employed, who are not too old to learn, in order to enable them to impart an useful education of an elementary character to the agricultural children who come to their schools. The earlier measure would therefore cost little or nothing. But as time goes on more than this may be done. Teachers of Natural Science and of other subjects connected with agriculture may be substituted for teachers of subjects not connected with agriculture, and the educational programme of the State may be gradually modified to the same end. Even this second step need involve but little expenditure. The only measure that would involve money, and this need not be taken for some three or four years, would be the importation of one very first class Agricultural Chemist for the whole Empire (one of the crying wants of the country) and the expansion of our best colleges so as

to include a first class diploma for sciences connected with agriculture. But the whole scheme would cost less than the present scheme for agricultural improvement, and would, with the exception of the Agricultural Chemist, be worked entirely by educated natives."

This last conclusion must now be materially modified by the present financial condition of the country as well as by the obligation since placed upon all Governments in connection with technical education. It is, however, rather for each Provincial than for the Imperial Government to decide how far funds can be supplied. I wish now merely to draw attention to the principles involved in the note, which proceeds as follows:—

"16. I have more than once expressed my belief that the present system of education, which excludes subjects connected with agriculture altogether, is doing considerable harm to the agricultural interests of the country by diverting the most intelligent and most ambitious portion of the cultivating population from agricultural interests. We have awakened in their minds intellectual cravings which under present conditions they can only satisfy by seeking professional or official employment. They have never been taught that it is possible for them to find intellectual interest and excitement in the pursuit of agriculture. The consequence is perhaps that the best part of the agricultural population is, on account of the impossibility of obtaining sufficient employment in other directions, becoming politically discontented, and it only requires a perusal of the numerous vernacular newspapers, which give expression to their feelings, to show that their thoughts and aspirations have never been directed to that great work of agricultural improvement which might at the same time satisfy their intellectual aspirations, and provide occupation sufficient to divert their thoughts from political questions with which they are incompetent to deal, but to which (rather than to the fields) they are led by the literary character of their instruction, too closely restricted as it seems to be to History, English Classics, Mathematics, and other subjects of an academical character.

"17. I do not suppose for a moment that the elementary education of the masses will have any immediate or early effect on the agricultural system of the country. I have, however, immense faith in the ultimate results of a widespread education in any given direction. Men of intellect and ability, forced by their educational bias to turn their thoughts or to seek for their intellectual excitement in the direction of agriculture, will sooner or later come to the front to lead the less intellectual masses in an upward path. The lower classes having had their sympathies developed in the same direction by their education will comprehend their leaders and be willing to follow, and the impulse towards progress will become in time irresistible.

"18. If, however, the educational policy which is now advocated is to have any immediate economical effect, it would become necessary to persuade Provincial Governments that they must abandon for the present any idea of establishing Agricultural Colleges and Schools of a high class. They must content themselves with allowing Elementary Science of the simplest kind to be taught in village schools, and with directing the agricultural mind to the study of Field Botany, and to the acquisition of some knowledge of those natural objects with which the daily life of the cultivating population is concerned or surrounded. In short, the object aimed at in the immediate future must be to teach in an elementary fashion "how a crop grows." This is what may be called the first process in the cultivation of the agricultural intellect, the first manuring of the mental field in which agricultural progress is to be developed. The development may be slow and immediately disappointing to the aspirations of zealous officials in the provinces—disappointing, indeed, to myself. I had looked forward to the early establishment of high class Agricultural Colleges; to the study, under skilled direction, of the Agricultural Chemistry of India; to the education of native students at Madras and Dehra instead of at Cirencester; to the maintenance of experimental farms under native management; to the establishment of cattle-breeding operations under that system which has been so successfully adopted by the Horse-Breeding Department; and to the general utilization of educated natives in the work of agricultural reform. To develop such plans is in fact, under the existing orders from the Secretary of State and His Excellency the Viceroy in Council, the positive duty of the Revenue and Agricultural Department. But the continuance of such a programme seems to be beyond the present financial resources of the country, and we can only hold up such schemes as these as the possible aim of future efforts in years to come. (The first of those years I hope has now come.) It is at least impossible to keep up the present position in which this Department and its offshoots in the provinces are required by the advocates of State action (represented prominently by the Famine Commissioners and those high officials who have adopted their policy) to take positive action in the direction of agricultural improvement, while they are thwarted at every step, either by the influence of those who hold opposite views or by the exigencies of finance. The only alternative, unless the agricultural interests of the country are to be altogether neglected by the State, is to declare a more humble programme. Therefore I suggest that, working for the present on a lower platform, we must be content with collecting agricultural facts, with giving the agricultural mind a bend in the right direction, and with awakening aspirations in the masses of the agricultural population which will find an easy satisfaction in the natural pursuit of their lives. When the soil has been thus manured and the seed thus sown, it may reasonably be argued that there will grow up sooner or later the vigorous plant of sound agricultural reform, with deeper roots and more certain nourishment

than can perhaps be the fate of what is now accused by unsympathising critics of being an exotic importation, transplanted from England to shallow and unmanured soil, to be watered and trained by official amateurs.

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"20. The plan under which the agricultural element should be introduced into the educational system should, as I have said, be formally discussed and decided by Agricultural and Educational Departments in consultation. I would now only ask leave, at the risk of iteration, to point out in another aspect the drift and object of the proposed policy. I can do this best, perhaps, by indicating what seems actually to take place in respect to the effect of existing education in regard to some other professions. If it is true that, on the one hand, our system of primary education leads to the acquisition of literary rather than of scientific tastes—tastes which are best satisfied by the profession of the lawyer, the schoolmaster, or the Government official—it is equally true that, on the other hand, the largest array of prizes held up for the temptation of educated youths is to be found at the bar or in district schools. Boys are brought up to be pleaders, teachers, or Government clerks because few other professions will give them such a good chance of utilising their education as a means of livelihood. It is a common occurrence now to meet with the sons of ryots or village barbers whose one ambition is to be a pleader or a Government official. The education and the prizes work, therefore, to one and the same end—an end laudable in itself, but detrimental to agricultural interests and fruitful of discontent, because where a large number of students aspire for a limited number of prizes, there must be many disappointed candidates. The policy now advocated would require instruction to be given in a new direction, namely, that of agriculture, and would require also the prizes of education to be so far increased in number, or so far to be modified, as to attract voluntary work in the direction of agriculture. For, if village schoolmasters and district schoolmasters are required to be teachers of Elementary Agricultural Science, and if Government officials are required, as they should be, to pass an Elementary Science test, then many students will readily apply themselves to the acquisition of Agricultural Science in the hope of a tangible reward in the form of a schoolmaster's chair or a writer's stool. Their exertions in the same direction will be increased if, at the end of the measurable period, the establishment of higher class agricultural schools or the introduction of a more difficult science test before admission to official employment should open out to them a prospect of the more highly-paid appointments. But a further advantage of perhaps still greater importance may be claimed for the policy in that those students who will have devoted themselves to Agricultural Science in the hope of a positive reward will not in the case of failure be left, as they are now, without any object in life except that of either persuading some friend or patron to get them into a Government office, or of vilifying authority in scurrilous newspapers. There will grow up, it may be hoped, an increasing tendency for their intellectual cravings to find satisfaction in agricultural pursuits. At present no educated youth will go back from school to hold his father's plough. This result of the educational system, however lamentable, is not surprising, since nothing in the scheme of instruction sufficiently connects the knowledge to be acquired by the son with the cultivation of the paternal acres. Is it not then time to counteract the hurtful tendency which the educational system thus has to divorce the better classes of ryots from their fields? Is it not time to give an agricultural complexion to the educational scheme which should grow in strength and depth in proportion to the growth of the newly awakened knowledge and interest in matters agricultural?

"21. It may briefly be suggested in passing that coupled with, and forming part of, the agricultural education of our schools should be instruction in village accounts, statistics, and records, partly with the object of leading up to the prizes offered by the official establishments which deal with those subjects, and partly with the object of training the agricultural population to learn how to protect their own interests in Revenue and Civil Courts, and also to answer to the call made by their commercial brethren for accurate information about the crops of the country.

"22. In support of the views expressed in the preceding paragraphs, I ask leave to quote from a paper by an educational officer of high position published in the April number of the *Calcutta Review* for 1883:—

'The education that we give makes the boys a little less clownish in their manners, and more intelligent when spoken to by strangers. On the other hand, it has produced two evils—(*a*) it has made them more litigious, that is, less inclined to settle their disputes privately, and more prone to waste their time and money in the atmosphere of the Government Courts; and (*b*) it has made them less contented with their lot in life, and less willing to work with their hands. It might be said with truth that discontent with one's present lot is the first necessary inducement to improving it. But the form which discontent takes in this country is not of a healthy kind; for the Natives of India consider that the only occupation worthy of an educated man is that of a writership in some office, and especially in a Government office. The village school-boy goes back to the plough with the greatest reluctance, and the town school-boy carries the same discontent and inefficiency into his father's workshop. Sometimes these ex-students positively refuse at first to work; and more than once parents have openly expressed their regret that they ever allowed their sons to be inveigled to school. It is not generally known that the education given at our vernacular schools has this effect on the student's character, but it is true, and there is overwhelming evidence to

prove it in any village or town where schools have existed. Even the sons of grain-dealers (banias), if they attend our schools (which is not often), become sometimes so demoralised as to despise the paternal trade, and consider that the education which they have received is too good to be thrown away on keeping an account book in bad Kaithi or Mahajani penmanship.

'It may not be out of place to point out that the same tendency is not confined to India. The danger of educating the agricultural classes in England in a wrong direction has been brought to notice by the Royal Commission, whose report on Agriculture was published in 1882, and from an abstract of which contained in the 18th volume of the Journal of the Royal Agricultural Society of England the following passage is taken:—

'There is a very general complaint amongst farmers that the present system of education operates prejudicially to the interests of agriculture. Boys, it is said, are kept at school at an age at which they might be usefully employed upon the farm, and be thus acquiring habits and tastes which would fit them for farm service. As it is, the standard of education is so fixed that not only are the first years of industrial training lost before a boy can attain it, but when he does attain it he acquires with it a desire for what he regards as more suitable occupation, so that the class which was formerly trained into farm service is now gradually absorbed into other industries. Farmers very naturally complain of this, as in districts in which there are school boards they have to pay for education, which not only deprives them for the present of the labour of boys, and obliges them to pay men's wages for work, but tends to drain from the land the sources of future labour.'"

I will now read the quotations from the Resolution in the Home Department on Technical Education to which I have already alluded. They are as follows:—

"23. The second class of considerations which have forced this question into prominence is concerned with the need of industrial occupation for a population rapidly outgrowing the means of support supplied by a too conservative system of agriculture. It is also concerned with the need for scientific methods to develop the material resources of India and to improve its agriculture, its products and manufactures, so that they may better hold their place in the markets of the world, where competition is carried on with an intensity of purpose, which has been compared to the conditions of warfare. But technical education in this latter sense—that is, in the sense of industrial education—is a matter not so easily dealt with as the technical education of the general preliminary character referred to in the preceding paragraph; and it therefore seems desirable that if the present impulse in its favour is to be successfully directed, the conditions the questions should be clearly understood.

"The subject is of such extreme importance, and the insignificance of what has been attempted in India is so conspicuous, that the Governor General in Council is deeply impressed with the necessity for action in whatever way may be practicable and sound. Some Local Governments have indeed recently taken practical measures to promote technical education, and these measures have been viewed with much satisfaction by the Government of India. But as it is desirable that the steps best calculated to promote technical education should form the subject of continuous enquiry and discussion, the Governor General in Council suggests that Local Governments and Administrations should on a convenient but early opportunity take action in two ways. Impressed with the existing want of information at hand as to the extent, character, and circumstances of important local industries in every province of India, His Excellency in Council would, in the first place, suggest that in each province an industrial survey should be completed. In the second place, he would recommend that, with a view to turning the knowledge acquired by such a survey to the best account in the light of the abundant information contained in the report of the Royal Commission on Technical Education, each Government and Administration should form a committee of educational experts and professional men, who should make suggestions from time to time for the auxiliary supply of appropriate means of technical education; for such modifications of the State system of public instruction as may aid and encourage industries and industrial employment up to the full measure of such requirement at each provincial centre as may be found to exist; and, when the circumstances are opportune, for the establishment of a Technological Institute, for the enlargement of the provincial Schools of Art and Design, and for the larger co-operation of the University in the promotion of the object in view.

"In furtherance of these suggestions, much valuable aid can be rendered by the various Provincial Departments of Land Records and Agriculture upon which the Resolution No. $\frac{6}{340\text{-}50}$ of 8th December 1881 laid the duty of promoting new industries, and of leading the people to a fuller knowledge of Agricultural Science."

The Agricultural Departments are thus placed under a distinct obligation to suggest and, by placing themselves and their agricultural experts in communication with the educational experts, to develop actual measures for the education of the rural classes in the direction of agriculture.

I will, in conclusion, briefly refer to the connection of the appointment of an Agricultural Chemist with a scheme of agricultural education. In

1882, when our first request for an agricultural expert was made, it was urged in support of the application that "as it was only through and by the native community that agricultural improvements could on any important scale be effected," the provision of instructors in Agricultural Science was necessary. It was in reply to that application that Her Majesty's Secretary of State suggested that a consideration of the measure should be postponed until Agricultural Departments had been more securely organized. But the form in which the application was made affords evidence that the view of the Government of India has been throughout that the agricultural expert should fulfil important functions in connection with education. The same view was strongly urged in our despatch of the 21st of July 1888. Doubts were expressed at home, which have been confirmed by the present Conference, whether the time of the expert-in-chief, as I may call him, should be occupied in actual teaching; and an alternative policy suggested by Dr. Voelcker has been accepted that actual teaching should be the duty of subordinate officials more or less under his direction, of whom the first at any rate should be the teacher demanded by the requirements at the Dehra and Poona schools for competent teaching in Agricultural Chemistry. But this modification of the original proposals does not do away with the obligation which will rest upon the expert-in-chief of regulating under the instructions of, and in consultation with, the Provincial authorities the curriculum of agricultural education, and of assisting to secure the development of the highest possible standard of education in sciences upon which agriculture depends. A system of technical education which depends solely upon the guidance of officials or teachers who are either inferior experts or no experts at all is sure to be subject to degeneration, want of continuity, and partial failure. I would therefore ask the members of this Conference to record their opinion whether for the security of a sound system of agricultural education the employment in this country of at least one expert of the highest class obtainable is not essential.

Mr. Finucane expressed entire concurrence in everything that had been said by the President, and with the views held by him on the subject of agricultural education in his note of 10th January 1886. In Bengal there ought to be an Agricultural College at Seebpore on the lines of those at Poona and Saidapet, for which the existing staff of teachers in the Seebpore College should, as far as possible, be utilized. There was an experimental station attached to Seebpore, but an educational farm was required as well. It would not be scientific or demonstrative, but simply maintained for the education of agricultural students. He would also like to see Agricultural Primers introduced into primary schools. One such primer, prepared by one of the Cirencester graduates, had been approved by the Educational Departments, and was in use in some schools. Agricultural teachers should be obtained from the parent institution at Seebpore and employed in middle class schools, which would have farms attached to them. They had no such agency in Bengal at present. He entirely concurred with the President as to the great service the Agricultural Chemist would be to the educational scheme, and emphasized the advantages of giving natives an opportunity of being educated in Physics and Science (including Agriculture) instead of in purely literary subjects. The Cirencester native graduates who were thus educated have done better work than men of the same class who have not had similar advantages, and have proved their superiority whether in settlement work, agriculture, or in the regular line. He also said that he attached great importance to the spread of primary education among the agricultural classes as a means to the ultimate introduction of agricultural improvement, and put in a note* in which his views were expressed.

The *Hon'ble Mr. Nolan* entirely agreed with Mr. Finucane in his estimation of the Cirencester graduates. It was, however, to be remembered that they were picked men originally selected from the best graduates of the Calcutta University.

Mr. Muir-Mackenzie mentioned the excellent results obtained by the employment of a Parsi graduate of Cirencester on the experimental farm of Bhadgaon in the Bombay Presidency.

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* *Vide* Appendix D.

Mr. Clogstoun, having expressed full concurrence in the necessity for developing measures for the education of the rural classes in agriculture, said that the subject of agricultural education had been exhaustively dealt with in the report of the Madras Agricultural Committee. Referring to the orders of the Madras Government on the report, he quoted the following passages* as illustrative of what they had decided on doing in Madras to advance the cause of agricultural education :—

"10. The question of education, the Madras Government observes, is dealt with at great length in the report, and the importance of it as a means towards agricultural improvement is strongly insisted upon. Dealing first with indirect education, the Committee recommends the abolition of the present system of exhibitions and the substitution of prizes for fields or farms, or specific items of farm management—a subject on which much interesting information is contained in Mr. Nicholson's note. It is also recommended that the diffusion of practical agricultural knowledge should be further stimulated by publishing the results of successful experiments and other useful information or suggestions in a popular form by means either of a departmental journal or casual papers.

"But it is to school and college education that the Committee attaches most importance, and more than half of the report is devoted to this subject.

"With reference to the Saidapet institution, the Committee lays down the proposition that a central college is absolutely essential for the training of the necessary agricultural experts and teachers and the provision of veterinary education. It recommends that there should be two courses in agriculture, corresponding to the two tests under the Technical Education scheme; that a separate branch of the college should be established for providing veterinary instruction; and that *Forestry* should be added to the list of subjects which are now taught. It suggests the revision of the present course of study, and recommends that the system of working the farm annexed to the College should be radically altered so as to make the practical instruction more varied and complete, and allow of more individual attention being given to the students.

"Turning next to the more difficult problem of school education, it is pointed out that *Agriculture* is already an optional subject in Standards IV, V, VI, and VII, and in the Primary, Special Primary, Middle School, and Upper Secondary Examinations; but, owing to the want of teachers, it is taught in very few schools, and even in these the instruction given must be far from satisfactory. The Committee does not recommend that the subject should be made compulsory, but suggests that the efforts of the Government should be directed to encouraging the study of it and providing facilities for the training of teachers. In order to secure this object, the Committee considers that special scholarships must be instituted and full advantage taken of the Grant-in-aid Code, which provides for special assistance being given to persons sent for training as technical teachers; and that *Agriculture* must be taught as an optional or compulsory subject in all District Normal Schools. The Committee acknowledges that the provision of qualified teachers can only be made very gradually, but it is of opinion that, if the policy sketched above is pursued steadily for a few years, marked progress will be made in the spread of agricultural instruction; and, in support of this view, the Committee refers to the rapid extension of the teaching of *Hygiene* since that subject has been regularly taught in elementary Normal Schools.

"11. His Excellency the Governor in Council agrees with the Committee in giving education a prominent place amongst the desiderata for a generally improved agricultural system, and this is being supplied as fast as circumtances will permit; but the long established usages of the cultivating classes, partly founded on ignorance, partly on poverty, and partly on custom to which they adhere with the tenacity of religious conviction, can only be changed or removed when desirable by special teaching and demonstration, and by instructors who can plainly show the people that new methods are real improvements adapted to Indian agriculture, apart from systems sanctioned by Western theories and Western practice. Special instruction in agriculture, however, is almost non-existent owing to the want of men competent to give it. The Committee proposes the system which has been described above; but although a scheme of this kind may become possible in the remote future, it is not practicable now, and must be replaced by something which, though less ambitious, is more in accordance with existing means, and yet not inadequate to existing requirements. The scheme which, in the opinion of His Excellency the Governor in Council, fulfils these conditions will now be briefly sketched.

"12. At or near the head-quarter station of five representative districts there should be established a combined agricultural school and farm. The school should afford general instruction up to the upper secondary grade, and special agricultural teaching up to the standard of the present junior department of the College of Agriculture. The farm should be worked principally in the interests of the school, but should also be available for experiment and demonstration. It should be under the management of the head master of the school, who, as well as the second master, should be a graduate of the Saidapet College, and capable of personally working farm implements and handling cattle. These farm schools will be educational

* The full orders of the Madras Government are printed as Appendix E.

institutions managed by the Director of Public Instruction; but the Director of Agriculture and his Assistant must be freely consulted as to their working, and the farms, so far as they are institutions for enquiry, experiment, and demonstration, will be under the exclusive control of the agricultural officers. The necessary funds will be provided in the budgets of the two departments, the charges common to both being distributed in such proportion as may seem suitable. It will in time become possible to connect these schools with the District Normal institutions, and by this means a class of teachers specially trained in agriculture will become available for supplying agricultural instruction in ordinary Primary and Middle Schools.

"The Board of Revenue should carefully consider the question of the location of the schools, and submit a statement of its views on the matter to the Government. The institutions must be within easy distance of a railway station so as to allow of frequent inspection by the Assistant Director, and for this reason, if it is decided to locate one in the Kistna District, it will be better to have it at Guntúr or Bezváda instead of at the Collector's head-quarters. In determining what five districts should be selected, special regard must be paid to the importance of obtaining conditions of soil, climate, and agricultural practices that are representative of a considerable area, and each farm should, so far as is possible, represent a different set of conditions.

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"14. Having now provided for schools and a college, the next matter is to connect them by means of a system of scholarships. The Directors of Public Instruction and Agriculture should accordingly consult and submit proposals for this purpose. The present scholarship scheme is not a very satisfactory one, and it must be considerably modified to suit the altered conditions. Probably the best plan will be a system of district stipends tenable at the five farm schools and a number of College scholarships to be awarded by competition among the students of these schools; but it is unnecessary to come to any decision on this point until the proposals of the two Directors are before the Government."

In addition to the five farms which it had been decided to start in the first instance, the Madras Government also contemplated in time having an agricultural school at the head-quarters of each of the 21 districts of the Presidency.

The *Hon'ble Mr. Nolan* asked whether the students of the Agricultural College were all given Government employment on completing their education.

Mr. Clogstoun referred to page 150 of the Agricultural Committee's report, where information was given as to the number of students of the Agricultural College who had found employment under Government.

Mr. Steedman: I take it that the question before the Conference is agricultural education as a means to the improvement of indigenous agriculture, and that the real issue is whether an extended agricultural education is likely to result in any real improvement in the agriculture of the country. Viewed as an abstract proposition, the substitution in part of an agricultural education, meaning thereby an elementary education in the Sciences, Botany, Chemistry, &c., connected with agriculture, for the purely literary education now given will surely commend itself to every member of this Conference. It must be an improvement quite apart from its bearing on agriculture.

In considering the question of agricultural education as a means to the improvement of agriculture, it will be convenient to divide the persons to be taught into two classes:—

(*a*) The cultivating classes—

(i) Large landowners.

(ii) Peasant proprietors.

(*b*) The non-cultivating classes.

I hold that the education of the non-cultivating class will be ineffective in improving agriculture, except in so far as it may provide—

(*a*) subordinates for the Agricultural and Revenue Department;

(*b*) a body of teachers for the instruction of the agricultural population in Elementary Natural Science, if such instruction is to be given.

Later on I shall touch briefly on the higher agricultural education that has been recommended by some of the members.

With reference to the education of the cultivating classes, I am, and have long been, convinced that the greatest importance should be attached to the education in Agricultural Science of the large landowners. In the Punjab I regret to say we have but few, but the zamindars of Bengal and the talukdars of the North-Western Provinces and Oudh are instances. It is to these men, I believe, that we must look for the most effective assistance and influence in the improvement of the agriculture of this country if it is susceptible of, and if there is any real room for improvement. I do not mean to say that it is not susceptible of improvement. There are few, if any, processes that can be called perfect. This is not, in my opinion, the question. The question is whether, given the existing circumstances more or less unalterable, the small holdings, the want of capital, the indebtedness, the cheapness and abundant sufficiency of labour, &c., there is much room for improvement, and whether such improvement is likely to result from the extension of agricultural education to the cultivators of the soil. Here I would note that in England the two most potent factors in bringing about improvements in agriculture have been an abundance of capital and an insufficiency and dearness of labour. It is insisted on in several papers before the Conference that education to be effective must reach "the actual cultivators of the soil." It is also stated directly and indirectly that the cultivator is apathetic and indifferent as regards improvements. Now I do not agree in this view. So far as my experience goes, the cultivators are by no means apathetic. You have had good cultivators everywhere; in the Punjab the Rajput, proud and lazy, and the Jat, thrifty and industrious; and the good cultivators predominate. By educating the Rajput in Agricultural Science you will not convert him into a thrifty husbandman. I am convinced that if you can prove by example that any new staple, any variety of existing staples, better wheat, improved fruit trees, a new fodder, a new kind of sugarcane, a new implement is an undoubted and a *paying* improvement on old staples or methods, &c., the cultivator will at once adopt it. Examples are—in Bombay improved varieties of cotton mentioned by Mr. Ozanne; in the North-Western Provinces improved seed wheat; in the Punjab oats as a fodder crop at Lahore; improved cotton, better fruit trees in the hill districts. Last of all I will instance the Beheea mill and its numerous adaptations. Here I can speak from personal experience. It was introduced into a part of the Rawalpindi District while I was Settlement Officer there. Wood was scarce and dear, and the *belua* and the *kohlu* were most expensive. I was told, and I have not the least doubt as to the correctness of the statement, that the cost of the Beheea mill was recouped by the economy it effected in a single season's pressing.

Now all the above improvements are not improvements in the processes of cultivation in the preparation of the land for production, and, as far as I know—I trust I shall be corrected if wrong—no such improvements have as yet resulted from the work of our Agricultural Department. I mean, for instance, deep ploughing, fallowing, the use of artificial manures, green soiling, &c. I may say that I doubt whether these processes as now practised by the better cultivators can be *profitably* improved on. Here, again, I must remind the Conference that I am speaking from my limited experience of Punjab agriculture. I will give two instances to illustrate my meaning that have come directly under my notice. In Jhang there is practically no rain or dry cultivation. Agriculture is carried on mainly from wells. On a well carefully farmed there is a regular system of fallow rotation. The unmanured land lies fallow for one or two years after it has borne a crop. The manure of the well-oxen is carefully conserved, and a flock of sheep and goats is kept to produce more manure. Roots are grown as a fodder crop. The land closest to the well is highly manured, and grows two crops in the year. The well-water is used with the strictest economy, the land is laid out in small embanked beds, and the larger water-channels are often "leeped" with a plaster of clay, cowdung, and chaff to prevent leakage.

In Rawalpindi, not 150 miles distant, you have a complete change both in the conditions of agriculture and in the agriculture itself. There is no irrigation, and the crops depend entirely on the rainfall. The grazing area is small, cattle are few, and manure is scanty. There is very little wood. The

system is this: The wheat crop is sown in November and reaped in May. As soon as rain falls in July, a crop of *bajra* is sown on the same land and is reaped in November, and then for a whole year, until the succeeding November, the land lies fallow, and is ploughed up as often as the rainfall and the resources of the cultivator will allow. Given the conditions, I do not see how this system is to be improved on. When the wheat is sown, the land is as clean as a garden and in a beautiful condition of tilth.

I give these two instances of how carefully the cultivator adopts his system of husbandry to existing conditions as a protest against the cry oft repeated for agricultural reform, for the revolutionising of indigenous practice, as if the agriculture of the country was just as bad as it can be, and the cultivator utterly indifferent to his own interest in the matter of husbandry.

I would therefore reiterate my conviction that we must look to the large landowners or to the management of Court of Wards' Estates, to persons who have an immediate and personal interest in improving the agriculture of their land, for any real and extended improvement in the general agriculture of the country. And in conclusion I would suggest that, if possible, some of these larger landowners might be given as an experiment a scientific education in agriculture at Cirencester or some similar institution.

Can we hope that any improvement in agriculture is likely to result from the instruction of the peasant proprietor in Agricultural Science? I would draw the attention of the Conference to the views of the Madras Government given in paragraph 11 of their Resolution No. 515 of 4th July 1890, and to the opinion of Mr. Fuller in paragraph 3 (*c*) of his note. It seems to me that even those who recommend the agricultural education of the actual cultivators have not much faith in its direct action in the improvement of agriculture. At the same time it will be an improvement in existing methods of education, and will so far be a gain, but that it will influence and hasten agricultural improvement I doubt. In the Punjab a very small percentage of the children of the cultivating class pass out of the Primary Schools. The instruction in Elementary Science that can be given to the boys in Primary Schools must be infinitesimal, and will be confined to reading a primer.

On a higher agricultural education, such as has been sketched out by the Madras Committee, I have but few remarks to offer. If we can get the larger landowners to go through the course, and after the course to return to their estates and make use of the knowledge they have acquired, I say we shall have achieved great things. For such an end I would hold out every inducement. What I deprecate is the creation of a B. A. degree in agriculture merely as a distinction to induce students who have no intention to take to agriculture as a means of livelihood to go through a course of Agricultural Science and Practice. Such an inducement will have but little influence on the men who do go back to their estates. I think these higher agricultural educational schemes are perhaps based too closely on English models. Take the English schools and colleges. Who are the students? They are landowners, land agents, tenant farmers' sons, future colonists, and teachers of Agricultural Science. With the exception of the latter class, they all look to a close and direct connection with agriculture and the soil for their livelihood. Now will you find their representatives in an Indian College? If you will, then I say that the college is needed, and must do much good. If not, then I object to the creation, at the expense of the State, of a number of spurious agriculturists, who go through a course or take a degree in Agricultural Science without the least intention, or wish to utilise their knowledge to the advancement of agriculture.

I think with the Hon'ble Mr. Nolan that agricultural colleges must be looked upon more or less as luxuries. More has been done in Madras than in any other part of India, and with little or no success. The Madras member of the Conference has referred to their large surplus, and apparently what has been spent in the development of agriculture in the Presidency is a flea-bite. But for a poor province I think it will be well to consider what I have said.

In any case, if a scheme of higher agricultural education is introduced, I do earnestly trust that it will be something more than mere book work. Make it

really practical. Make the students familar with their indigenous native system of farming. I look to the advice and presence of the Agricultural Adviser to the Imperial Government as a guarantee that this will not be lost sight of.

In conclusion, I wish to express an opinion that agricultural improvement is more likely to result from agricultural experiments and demonstrations in experimental stations and farms than from agricultural education. Therefore, as far as the Punjab is concerned, I would sooner spend money on the formation of a central experimental farm, with *small subsidiary* stations at each district head-quarters, than in the extension of what is called agricultural education or its substitution for any portion of the present literary curriculum. The head experimental farm should be under a trained agriculturist. The district stations would be under a man more of a head gardener than a trained agriculturist, such as are trained at the Agri-Horticultural Gardens at Lahore and recruited from the Arians, our very best cultivators. The expense of the central farm would be borne by the Provincial Funds; that of the district stations by the Local Funds. I am perfectly aware that the objection can be made that these district stations will not be properly supervised, but I nevertheless would sooner spend money on them than in the agricultural education of the masses, the object being the improvement of agriculture.

Mr. Thomson: Mr. Steedman has already anticipated almost everything which I wished to say, and I need not add that he spoke with much more authority than I can claim. With almost everything that he said I entirely agree. I think it is quite easy to approve as an abstract proposition the statement that agricultural education should be improved. But I prefer to put the more particular questions—Why do you wish to give agricultural education? Whom do you wish to teach? and what do you wish to teach them?

As to these questions, I presume that the only possible reason for imparting agricultural education is to improve agriculture. This being granted, it follows that, unless we are able to teach the actual practical farmers, we are not likely to achieve any result about which the Government of India need greatly care. Now, in the Punjab these farmers are men who hold from 8 to 15 acres a piece, and on these men, I think, any high collegiate education would be thrown away. Either they will fall out of touch with their fellows, and cease to be of service to them, or they will take to other pursuits and abandon agriculture. You may get excellent settlement officials, tahsildars, or managers of Courts of Wards, but improvers of agriculture you will not get.

It follows from this that any education in agriculture in the Punjab must at present be confined to an elementary scale; that is, it can hardly be agricultural teaching at all, but must be confined to such subjects as the manner of the growth and nutrition of plants, and the general principles of Vegetable Physiology. I do not imagine that such lessons will be of much practical utility, at least not immediately. But they would probably be interesting, and would tend to establish a distinct type in education, and vary the unfortunate uniformity of spurious literary culture. In a few cases they might lead to an opening of mind and useful practical observations.

I have no doubt that collegiate education in agriculture may be extremely useful in other provinces. Many able gentlemen seem to be of that opinion, and I have no desire to gainsay them. All I wish to point out is that we are not prepared to adopt such plans in the Punjab, and I would ask the Conference to abstain from what I cannot but think the unscientific process of laying down one set of principles or doctrines to govern a half score of provinces in all varieties of condition, character, and development.

One other thing I wish to add, and that is that the Agricultural Chemist should have no concern with agricultural teaching beyond giving the most general advice. The more the Agricultural Chemist can be confined strictly to his proper scientific duties, the more likely he is to do his duties well and to be really useful.

Mr. Fuller said that he would begin by briefly stating what was being done in the Central Provinces in the way of agricultural teaching. The steps that had been taken there were the direct outcome of the Government of India

Resolution of 1887 on Technical Education, but (he might observe) followed very closely the lines suggested in Sir E. Buck's note of 1886. A Committee was formed to consider the subject of technical education, and the Chief Commissioner recorded a Minute on their recommendations in April 1888, from which the following was an extract:—

"Our funds are too small for comprehensive schemes. But we can, I think, do something to lay solid, and even broad, foundations upon which our successors may be able to build. If we can in our ordinary schools train the pupils to use their eyes and hands by making drawing a necessary part of their education, and if we can stimulate their minds by teaching them the Elements of Physical Science, illustrating the instruction by simple experiments, we shall have made at least a good beginning. Then I think we can with great advantage to the province and to the public service give some special training in the elements of Engineering and in Agricultural Science."

On the receipt of the Government of India Resolution No. 345-55-C.I., dated the 25th March 1890, Mr. Munro, the Inspector General of Education, was asked to report on the progress which had been made on the lines laid down in this Minute. His reply was as follows:—

"I am asked to report to what extent the principle laid down in paragraph 8 of the Resolution of the Government of India, Revenue and Agricultural Department, No. 345-55-C.I., dated the 25th March 1890—*viz.*, that the education of the agricultural classes, and especially of the lower classes, should be so directed as to enable them to appreciate and, where expedient, to follow the results of experiments—is acted upon in these Provinces. I would observe that the policy of the Education Department since I have been in charge of it has been to develop and carry out the reforms and improvements laid down by the Chief Commissioner in his Minute on Technical Education, dated the 4th April 1888. The object of that Minute was generally to divert education into a less literary channel, and to make it more practical and useful. As observed by the Chief Commissioner in the Minute—'If we can, in 'our ordinary schools, train the pupils to use their eyes and hands by making drawing a 'necessary part of their education, and if we can stimulate their minds by teaching them the 'elements of Physical Science, illustrating the instruction by simple experiments, we shall at 'least have made a good beginning.' It is on these lines that we have worked for the past two years. Drawing is now recognized as one of the most important subjects of study. It is taught in all our High and Middle schools with success, and in the majority of primary schools with tolerable success. Special prizes for drawing are offered on the results of the Middle School examination. The study of Physical Science is begun in the upper primary standard, and a special examination for prizes is held annually for candidates who have passed the Upper Primary examination. Prizes for Physical Science are also offered on the results of the Middle School examination.

"Object lessons as preliminary to Physical Science are taught in the lower primary standard. Itinerant instructors in the subject were appointed for a period of two years, and have nearly finished their work. As regards the training of the senses, instruction on the Kindergarten system is given in the first two standards, and a system of manual training as taught in the schools of the London School Board is being introduced in the standards above the second, thus taking up hand and eye training at the point where the Kindergarten leaves it. This system includes wood work, modelling in clay and card board, and is well calculated to develop accuracy of hand and eye. It is based on drawing. Each student is required to draw to scale the object which he wishes to make, and then to make it from the drawing. The engineering and agricultural classes established under the orders of the Chief Commissioner in 1888 have been successfully conducted. As regards agriculture, the vernacular translation of Mr. Fuller's Agricultural Primer has been supplied to all Hindi schools, and will shortly be supplied to other schools. The subject is very popular. One of the Inspectors reports that members of School Committees often ask to be allowed to attend during the agricultural lesson.

"An examination for prizes in agriculture open to candidates who have passed the Upper Primary examination is held annually. The main objection to the instruction in agriculture as given in our schools is that it is entirely theoretical. I have, however, attempted to remedy this defect by introducing a system of school gardens, which will not only enable the teachers to illustrate what they teach, but will provide the boys with useful occupation. The Commissioner of Settlements and Agriculture has offered to draw up a scheme which will be shortly introduced. The work of planting and watering, &c., is to be done by the boys themselves. Each student is to have his own plot of ground, and the sale proceeds are to be credited to the boys themselves. I hope by the next cold weather to see gardens containing European and Native vegetables established in a fair number of our primary schools. District Councils have offered prizes for the best school gardens. The scientific training in agriculture of teachers is another question which has engaged attention. Most of our teachers have but a superficial knowledge of the subject. To meet this objection, it is proposed to utilize the agricultural class as a training institution, and to send annually a few teachers from each district to undergo a course of training. By this means I think that in a few years sound and practical instruction in agriculture will be given in our schools. To recapitulate, I think that it may be said that we have done as much as could be done in a short time to give a practical bent to the education of the agricultural and lower classes."

It should be explained that the establishment of school gardens had only just been taken up, and that it was as yet too early to give a definite opinion as to their success. They promised well in some places. The Agricultural Class referred to in the Chief Commissioner's minute and Mr. Munro's letter was started in April 1888, and had been on the whole very successful. The following extracts from the class prospectus were read :—

" 2. The class building and fields for practical instruction in agriculture are situated on land forming a part of the Government experimental farm, which is also made available for practical instruction in agriculture.

" 3. The class, though placed under the Educational Department, is directly under the control of the Commissioner of Settlements and Agriculture, Central Provinces. The staff consists of a Principal and two assistants.

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" 5. Candidates for admission to the class must have passed the Middle School or the Matriculation Examination, preference being given to the latter. No candidate will be allowed to join who is physically unfit for practical work, or (unless admitted for special reasons) who is under 16 years or over 21 years of age.

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" 7. No fee is charged to the students for receiving instruction in the class.

" 8. There are no special scholarships for the class, but the scholarships granted by the Educational Department are tenable at the class.

" 9. Students who are not residents of Nagpur are given free quarters, but they must make their own arrangements for their board.

10. " The course of study occupies two years, with a long vacation each year from 1st April to 31st May. Attendance at lectures in the laboratory and at practical work in the fields is necessary. Irregularity of attendance disqualifies a student from appearing at the examination.

" 11. The course of study comprises—

Agriculture (theory and practice).
Surveying (theory and practice).
Chemistry (theoretical and practical).
Botany.
Geology.
Elementary Veterinary (practice and science.)
Drawing."

" 12. The following are the text books appointed :—

Agriculture—
First Principles of Agriculture—*Tanner.*
Elementary Lessons in Agriculture—*Tanner.*
Agricultural Primer—*Fuller.*

Chemistry—
Science Primer—*Roscoe.*

Geology—
Science Primer—*Geikie.*
Manual of Geology for Indian students—*Cooke.*

Botany—
Science Primer—*Hooker.*

" 13. To ensure that the students acquire a practical knowledge of agriculture, plots of land are allotted to them which they are required to cultivate with their own hands. They are permitted to keep the produce. The students also maintain a labour journal and cultivation book for the experiments conducted on the experimental farm.

" 14. The course of instruction in surveying largely consists of practical work with the plane table, chain, and theodolite.

" 15. A small veterinary dispensary is attached to the class for practical instruction in the treatment of the more common forms of cattle disease."

Every effort was made to render the instructions thoroughly practical both in the field and laboratory, and a satisfactory measure of success had been attained. The students spent a couple of hours in actual practical farm work most days of the week, and they had taken very kindly to it, although at the outset difficulty was experienced. The result of the examination held last April at the

end of the first two years was very good. Practical surveying formed an important item in the curriculum, which also included Geology, Botany, Chemistry, and the Elements of Veterinary Science. There were at present 34 students in the class.

The students undoubtedly only come with the object of getting into Government service. But they were all wanted in Government service. Those that had been tried had done distinctly better than the general run of Arts students who had read up to the Entrance Examination.

So far as his own opinion was concerned, Mr. Fuller expressed himself strongly in favour of the introduction of agriculture into primary and also into higher education.

In regard to primary education in agriculture, his views had been expressed in a note * which he laid before the Conference. The study of agriculture had been introduced into village schools in the Central Provinces because it was believed that it would lead people to think more of the subject, in which case improvement would surely follow. In the Central Provinces there was certainly great room for improvement if only in the matter of greater industry. While not undervaluing the intelligence or experience of the ryot, he was quite unable to subscribe to the view that the agriculture of the country was the best possible under the circumstances, and was incapable of improvement. One fact to the contrary was the influence of caste, which greatly restricted the agricultural efficiency of a large portion of the population. But education in the broadest sense of the word was undoubtedly breaking down caste restriction.

The *President* remarked that high caste ryots would not at first grow indigo in the North-Western Provinces, but now they do.

Mr. Fuller admitted that the only agricultural teaching which could be given in village schools would be very elementary, and chiefly confined to principles. We could not undertake to teach the details of practical farming. But we might awake an interest in the subject which would lead to practical results. In any case the substitution of an Agricultural Primer for one of the ordinary school reading books could do no harm; and if the agricultural teaching was illustrated by object lessons as was intended, it would turn out better men, if not better farmers. The great difficulty was the training of the teachers. Special Normal Schools were required. A special vernacular class for village schoolmasters was being opened in Nagpur in connection with the agricultural class.

As regards higher education, he observed that the teaching given at the Nagpur agricultural class led to the conferral of no distinction or degree. But it gave a claim to Government service, and the result was the same in attracting students. University certificates and degrees were, of course, in greatest part valued as a means of getting into Government service, not for their own sake. He deprecated the tendency to judge agricultural teaching by the aspirations of the students, and to condemn it if it could be shown that they learnt not to become farmers themselves, but to obtain employment. He fancied that this was a charge which might be brought against any Agricultural College in any country. Even supposing that the men educated in an Agricultural College did nothing but take to Government service, the value of their training to the country might be very great. The present subordinate revenue officials were, as a rule, absolutely ignorant of agriculture, and were quite unable either to second the efforts of their superiors for its improvement, or to strike out ideas of their own. A great deal might be expected if tahsildars and men of similar rank were acquainted with some Agricultural Science. He instanced cases in which men in the Central Provinces Settlement Department, who had been trained at Saidapet and Poona, had used their opportunities to stimulate the people to improvement. Finally, he considered that the introduction of agriculture into the higher education of the country would have a beneficial result, in that it would probably exert an influence on public opinion and lead to more attention being given to agriculture as a profession. The natives of this country were very ready to catch up general notions of this sort. But he thought that there was a great risk that higher education in agriculture would miss its mark

* *Vide* Appendix F.

in not being sufficiently practical. He believed that much of the science teaching given in this country was merely arts teaching under another name, as the course was only one of books, and no attempt was made to bring the minds of the students into contact with things. Hundreds of men who had passed in Chemistry here, he believed, never handled a test tube. He had on the preceding day stated that he was much in favour of the appointment of an Agricultural Adviser to the Government of India, and he would make it one of this officer's duties to control and inspect agricultural education, so as to ensure its being practical and not mere cramming up of books and papers.

The *Hon'ble Mr. Benett* thought the scheme for agricultural education should be connected with existing educational institutions and not made separate. He was in favour of agricultural education being given early in the ordinary course taught in Government schools. If agricultural education is not associated with general education, the people will not care for it. He recommended that it should be introduced with the upper primary standard, *i.e.*, after writing and reading have been attained, and that three lessons a week would be sufficient. He also thought that Elementary Agriculture should be taught in Normal Schools. Education on these lines would go on till after the Entrance Examination, which should be raised till it became a test of a general education. They would then take up agriculture as a special branch of science. If this were impossible, the general education with agriculture as part must continue till the First Arts Examination. He thought the scheme laid out by him the only feasible one. He did not anticipate any great advantages from educating the cultivating classes; they know all they want already. The *Kshatri* will always remain a bad cultivator until driven by necessity to greater exertions. His reform would not be effected by instruction in agriculture.

He thought nevertheless that a leaven of officials educated in agriculture would be most useful, *e.g.*, a tahsildar who could advise regarding a water-logged soil. Trained agricultural students would, he believed, be in request among large landowners. In the North-Western Provinces the talukdars had promised them a house at Lucknow and a large sum of money to start a Technical College, but they had no proper agricultural adviser to guide them, and without one they could not make a start. He also thought that the presence of an Agricultural Chemist might lead to some real discoveries, and that the introduction of a scientific element, in addition to the present almost exclusively literary course, would be a benefit to general education.

The *Hon'ble Mr. Nolan* observed that Mr. Finucane's suggestions for promoting higher education in Bengal had been favourably considered by Government, and action would be taken upon them if funds could be provided for the purpose in the next Provincial contract. The question is not urgent, there being at present no great demand for instruction of this class, which in Madras is accepted only by students paid to learn, and whose sole object is to obtain Government employment. In the Central Provinces, too, as stated by Mr. Fuller, all agricultural pupils are candidates for the public service, while in the North-Western Provinces the Hon'ble Mr. Benett despairs of obtaining any scholars if they are not bribed with the prospect of a Degree at the new University, presumably to be obtained on no very onerous terms.

Much more importance attaches to the suggestion in Sir Edward Buck's note placed that morning on the Conference table that an agricultural bent should be given to primary education generally. In India, as all the world knows, each class has its own industry or occupation, and that of cultivating the soil has been assigned by immemorial custom to the ryots. The great proprietors confined their attention to the collection of the rent, and to certain social or political functions having no connection with agriculture. Now as the sons of ryots did not go to colleges, we could in such institutions teach farming only to those who never farm on their own account, however willing they might be to accept salaried offices under the Department. At the primary schools, on the other hand, the future cultivators may be instructed, and he quite agreed with Sir Edward Buck that this should be our ultimate object. On the other hand, he took exception to phrases in the note,

perhaps inadvertently introduced, which gave expression to the common belief that the sons of ryots as a body are at present educated, indeed over educated. It was said that we are "teaching to the masses of the agricultural population everything else in the world except Agriculture," History, Mathematics, and the English Classics being particularly specified as subjects in which the cultivators are instructed. The Hon'ble Mr. Nolan ventured in contradiction to such statements to assert that to the mass of the agricultural population we are teaching nothing at all; that they are left to grow up in absolute ignorance. What are the facts as ascertained at the last census? Of males above five years 89·6 per cent. could not read or write, and were not under instruction. The remaining 10·4 per cent. is sufficiently accounted for by the classes among whom a desire for learning is hereditary, an examination of the returns showing that these exceeded that proportion; the masses are left untouched. No one intending to occupy a position among the ordinary agricultural population ever learned English Classics, History, or Mathematics. Even to the primary schools in which little is taught beyond the three R's, the literate classes supply in Bengal 33·1 per cent. of the pupils, the Nobosaks 27·7, the artisans 30·4, agriculturists and labourers only 8·8. The latter fraction of the fraction able to read and write, that is, of 10·4 per cent. of the population, indicates in some degree what we are doing for the education of the ryots. The census figures do not state the percentage of instructed for cultivators separately; for aborigines, who have no other resource than the products of the soil, it is ·4 per cent. Neither can it be said that the returns afford assurance of immediate improvement, as they would do if they showed a knowledge of reading to be prevalent among members of the rising generation than among those advanced in age. The only tabular statements on this point quoted in the report are for Madras, and they stand as follows:—

Age.	Percentage of educated males.
15 to 20	15·41
20 „ 25	16·94
25 „ 30	16·97
30 „ 40	16·42
40 „ 50	17·37
50 „ 60	18·08
60 and upwards	16·77

The educational reports were not before him, but he understood they now gave about 20 per cent. of the male population of school-going age in India as under instruction. It was, however, notorious that a large proportion of these never learned to read or write, merely attending school for a short period to swell the returns. Moreover, the children of school-going age are taken at 15 per cent. of the population, which is too low a standard, and its assumption makes the proportion under instruction appear too high.

The fact is that the cultivators are illiterate and their children are growing up in ignorance, the exceptions being so rare and isolated as to be of no account for agricultural purposes. Now if there is one principle on which modern statesmen in all countries are agreed, it is that popular education is the only means by which the condition of the masses can be permanently raised; and this truth has a special application to India, where these illiterate labourers are left to accomplish without superior guidance the great economic task of the country, that of raising the annual crops on which we all subsist. To the wide induction on which the inference rests that general education is essential to the well-being of the masses, India adds two crucial illustrations. In one of its provinces only is a majority of the population instructed, and in it only is prosperity universal. Elsewhere of those engaged in cultivation there is only one class educated up to the European standard engaged in cultivation, and by that class only are profits realized on the European scale. Agricultural Chemists, colleges, stations, exhibitions, and so forth are very well in their way, but general and decisive effect cannot be produced otherwise than by raising the farmers of the country intellectually to the moderate level now insisted

on in regard to the humblest inhabitant of every civilized country. The question is one of the hour. The Government of Bengal, for instance, has recently submitted proposals for extending education to the masses, even at the cost of special taxation for the purpose. He hoped that the members of the Conference—and exercising, as they did, great official influence—would not separate without lending the weight of their authority to this view by formal resolution, and he begged leave to move—

"In the opinion of this Conference no measures for the promotion of agricultural progress can be regarded as complete which do not include provision for a substantial extension of elementary instruction to the class of cultivators."

Mr. Robertson : I agree with a great deal that Mr. Steedman has said, and I think we must not be too sanguine as to any immediate improvement being produced in the methods of the small farmer by education in Agricultural Science either primary or higher. But I think Mr. Steedman has devoted his remarks too exclusively to one side of the question. Quite apart from its possible immediate effect on the "ryot" or "cottier," I think it is most desirable that a higher education in Agricultural Science should be obtainable at some place or places in this country, and I would almost go as far as to say that in a country situated as this is, it is the duty of Government to see that such an educational course is provided for. I think, therefore, that wherever sufficient funds are available—and there is a fair demand for it—such an educational course should be provided, and I agree with the Hon'ble Mr. Benett that where it is provided it should be in close connection with the general course of education, and with existing educational institutions. There should be complete reciprocity between provinces in the matter; and if such an education be provided in the North-Western Provinces, it should be freely available to, and made use of by, the Punjab, and in turn the North-Western Provinces might make use of, and give encouragement to, the Punjab Veterinary College.

The circumstances of the various provinces are very diverse, and each should be allowed to proceed on its own lines.

In the Punjab a very good start has been made in the direction of veterinary instruction in the Lahore Veterinary College. The zamindars have taken to it, and it would be well to direct our chief attention to development in this direction, so important in connection with agricultural stock. There is no demand yet for higher agricultural education, and it would not be right for a poor province to launch out in expenditure upon such schemes.

We must all agree that the spread of primary education is most desirable, but the fact that the numbers of pupils in the schools is not as great as we could wish should not prevent our doing all we can for those, especially of the agricultural classes, who do come. If the zamindar can be roused to think for himself that it is possible to improve on his traditionary methods, not a little will have been done.

I was much struck by a remark in his report on the jubilee of the Royal Agricultural Society of England on this point by Sir James Caird. He pointed out that the best farming in England is very much as it was in 1851. The main progress has been made in the direction of bringing up the method of inferior farmers to the standard of the best.

These are the lines we should work on out here, and the Agricultural Primer which we have just submitted for adoption in the Punjab is drawn up on those lines, and I think our aim should be rather to bring to the notice of the farmers and cultivators better staples, better seed, and better methods, which are known to have been successful in other parts of the country, than to make expensive experiments in entirely new directions. This, I understand, is very much the direction in which Mr. Ozanne is working in Bombay.

Finally, although I do not say that any immediate improvement in agriculture will necessarily follow from either higher or primary education in subjects connected with agriculture, I hold strongly that the higher education should certainly be available for officials and others at some suitable spot in

the country, and that primary education may do something, and will be at least as useful as any other kind of primary education. We should do what we can in this direction, even if it is only a little that we can do. I think therefore that a good system of higher agricultural education should be provided in India.

Dr. Cooke: Not only has the importance of agricultural education been fully acknowledged by many of the members of the Conference at its present sitting, but for some few years past there has been a cry throughout India for *technical* education as distinguished from the class of education which we have hitherto offered to the youth of the country; and in an agricultural country like India, which derives the chief portion of its wealth from the soil, I think it must be admitted that Scientific Agriculture is by no means the least important branch of that technical education which the country demands.

It does not follow that all the men instructed in Agricultural Science must necessarily follow the profession of agriculture. The course of study necessary for the highest standard in agriculture is one which will supply a most useful and practical education. A course of study which embraces such subjects as Physics, Chemistry, Geology, Botany, Surveying, Veterinary Science, and Agriculture should, I think, be at least as valuable for natives of India as a curriculum including Latin, Logic, and Philosophy.

The former class of education will certainly tend more to produce men of habits of observation and investigation than the latter, and be less likely to swell the ranks of the National Congress.

Moreover, in the proposals for an Agricultural Chemist and for experimental farms which we have agreed to, the necessity has been clearly shewn for scientifically educated subordinates to supervise the farms and conduct the operations thereon—men sufficiently well taught in Agriculture and the allied Sciences, and with their powers of observation so trained as to enable them to make deductions from intelligently conducted experiments.

Mr. Finucane yesterday went so far as to say that he considered agricultural education a primary necessity of greater importance even than experimental stations. The stations in fact cannot progress without the men to supervise them, and the men can only be trained by a properly organised system of agricultural education.

I hope I may be pardoned if I give a brief history of agricultural education in the Bombay Presidency.

Sir Richard Temple, when Governor, was the inaugurator of agricultural education in Bombay about ten years ago.

He established two kinds of classes in agriculture—the first, or higher, for which a high standard of entrance as well as final examination was demanded; and the second, or lower, for which a much less advanced standard was required.

Sir R. Temple considered that he could without much difficulty or additional expense graft the higher class on an existing institution which already gave instruction in certain of the branches required for an agricultural education, and he selected the College, of which I have the honour to be Principal, as the institution to which he would entrust the higher agricultural education of the Presidency.

The College was at the time the Civil Engineering College of the Bombay Presidency, and the course prescribed for Civil Engineering by the University of Bombay included many subjects required for an agricultural education.

The curriculum for Civil Engineering in the University included Chemistry (with Qualitative Analysis), Physics, Geology, Surveying, and Drawing, so that by adding Botany, Veterinary Science, and Agriculture a very fair course of study for agricultural students could be obtained.

A teacher in Botany and Agriculture was provided. Arrangements were made with one of the Military Veterinary Surgeons to deliver a course of

lectures on that important subject, and a small farm of 15 acres was added to the College. This was afterwards enlarged to about 60 acres. Shortly after a Science degree was established by the University for which the College was affiliated. A Forest class was subsequently added, and the title changed from College of Civil Engineering to College of Science.

The College at present contains a large workshop, with steam machinery worked by two steam engines; a chemical laboratory with a qualitative analysis laboratory for students; a botanical garden; a museum of Indian products, and an herbarium; a physical laboratory, which is one of the best furnished in India; a geological museum; an observatory which contains the largest telescope in India (16½-inch reflector); a veterinary hospital, where cattle are treated under a Veterinary Surgeon; and, lastly, a bacteriological laboratory recently established for the investigation of cattle diseases.

Residences for students have been erected on the farm, which at my suggestion has recently been handed over to the Agricultural Department. Shortly after the establishment of a College class in Agriculture, Sir R. Temple instituted the lower classes for agricultural instruction to which I have already referred. These classes were at first eight in number, and, following out the principle already adopted of grafting a class for special education on an institution already in existence, Sir R. Temple attached these eight classes to eight of the High Schools of the Presidency.

Dr. Voelcker yesterday expressed his opinion strongly in favour of attaching institutions for agricultural education to existing educational institutions in preference to isolating them, and I am of opinion that this is the best and most economical method of securing to students the benefits of general as well as special education, as well as continuity in the system of instruction. The plan on which the classes attached to the High Schools were worked is fully described on page 139 of the Madras Committee's Report, paragraph 160:

"In Bombay the programme of studies for the agricultural classes attached to the High School extends over two years. The first year is devoted to Chemistry, Huxley's Introductory Science Primer, 105 pages of Balfour Stewart's Physics Primer, and Tanner's Agriculture. The second year's course includes Roscoe's Chemistry Primer, the whole of Balfour Stewart's Physics Primer, Wrightson's Agriculture, Hooker's Botany Primer, with Johnston's Botanical Diagrams, Geikie's Physical Geography Primer, and Geikie's Geology Primer. Students may also obtain certificates in Land Surveying, Drawing, Physiology, and a more extensive course of Botany; but the study of these subjects is not compulsory. Students entering the agricultural classes must be learning a High School standard, *i.e.*, standards IV, V, VI, and VII. These standards correspond in a general way with our lower and upper 4th, 5th, and 6th classes. Boys taking up the agricultural course are excused the classical language, and after obtaining a first class public certificate, they are also excused History and Geography lessons. Revenue officers are invited in filling up appointments to give preference to boys holding the second year High School agricultural certificate, and boys who pass are also eligible for admission to the Civil Engineering College in the lower or non-University class. It is perhaps owing to these inducements that the classes are well filled, although the course is an optional one. The annual examination is entrusted to the Principal of the Civil Engineering College. To each school a small piece of land (6 acres) is attached for practical instruction with an initial expenditure of Rs. 70 per acre for stocking, &c., and an annual expenditure of Rs. 60 per acre for working expenses."

The College class was worked for many years on the system according to which the final examination was held and final certificates awarded to the students at the conclusion of their course of study by the College, and during the time that it was so worked it turned out many very excellent men from its classes. Some of the students who passed through the College class have been eminently successful, and the influence of the agricultural branch of the College has been extended into provinces other than Bombay. Mr. Fuller will, I believe, bear me out in my statement that many of the passed pupils of the College agricultural class have been found valuable assistants. But we soon found that a College certificate did not possess in the eyes of the natives the same value as a certificate from the University of the Presidency, and several attempts were made to induce the University to recognize agricultural education by granting a degree in that subject. I am glad to say that after several unsuccessful attempts to influence the University, a signal success was achieved last year, and the University at last has consented to institute a diploma in Agriculture.

The University went further even than this, for it has included Agriculture as one of the voluntary subjects in its new school final examination, so that we have in Bombay at present both the higher and lower grades of agricultural education recognized by the University of Bombay.

From my own knowledge—and I may say that my experience has extended over many years, as I have been Principal of the College for 25 years, and I have on two occasions acted as Director of Public Instruction—I most confidently affirm that, unless a teaching institution is connected in some way with the University, it is sure to fail.

In looking over some papers yesterday, I came upon a memorandum drawn up by Mr. Ozanne, who gave every possible assistance in our mutual efforts to influence the University to establish an agricultural diploma. This memorandum was circulated to all the Fellows of the University, and I will read it—

"The proposal to establish a diploma in Agriculture will be brought before the Senate on the 12th September.

"A curriculum has been drawn up in 1886 by a Committee nominated by the University. The proposal is that the Faculty of Civil Engineering should be extended to embrace agriculture. The curriculum provides for a 3-year course and for an examination at the close of each year.

First year—

(1) Mathematics. [Algebra and Euclid.]

(2) Natural Science—

(*a*) Heat.

(*b*) Botany. [Morphology and Physiology of Plants.]

(*c*) Agriculture. [Soils, manures, and implements.]

Second year—

(1) Mathematics. [Trigonometry and Mensuration.]

(2) Natural Science—

(*a*) Chemistry, Inorganic and Organic.

(*b*) Systematic Botany.

(3) Veterinary—Anatomy and Physiology of farm animals.

(4) Agriculture—Culture of various crops and preparation for the market—Rotation of crops—Fruit culture—Irrigation.

Third year—

(1) Natural Science—

Agricultural Botany.

Agricultural Geology.

Agricultural Chemistry.

Qualitative Analysis.

(2) Surveying and Levelling.

(3) Veterinary Pathology, Hygiene and Obstetrics.

(4) Agriculture—Breeding, feeding, and management of cattle—Parasites of farm animals.

"2. The course is sufficiently wide, and there are now facilities afforded for instruction therein. At some of the High Schools elementary training is given to fit those students whose object it is to proceed to the diploma for the higher instruction which is available at the two recognized centres—

(1) The College of Science, Poona.

(2) The Baroda College.

"At the College of Science there is little wanting. The subjects which enter into the curriculum for the degree of Civil Engineering are taught in the ordinary course, and there is a special agricultural branch. Much attention has been paid to the proper equipment of this special branch. Theoretical instruction is imparted in the College lecture rooms, and there is attached to the College a well equipped instruction farm managed, as it should be, by the Agricultural Department, where practical instruction is given by the Farm Superintendent. The farm has a small herd of selected cattle of the best milking breeds, and a small Veterinary Hospital, under a qualified instructor, is placed close to the college and farm. In the College and in the Hospital the students receive practical and theoretical teaching from a Veterinary Surgeon. In Bombay there is a Veterinary College and Hospital to which those students of the College of Science who wish to make veterinary their speciality can repair, but the veterinary teaching of the College of Science is adequate for the purposes of the proposed diploma.

"Quarters for resident students on the farm are being erected. The laboratories and lecture rooms are all that can be desired. In short, the College of Science has, under the Government scheme for technical education in agriculture, been amply equipped, and is fit to take its place as the Agricultural College of the Bombay Presidency.

"Two steps are yet to be taken—

"(1) A trained agriculturist from England is required to manage the experimental farms of the Agricultural Department, and especially the instruction farm attached to the College. This officer is about to be brought out.

"(2) An Agricultural Chemist of European reputation is needed; and requisition has already been made for such an officer, who is to spend three months of the year at Poona.

"The Baroda College in its capacity as an agricultural college is following in the steps of the Poona College. A chair of Agriculture has been sanctioned, and a Professor will fill it from November next.

"3. It cannot be held then that it is premature to ask the University to give all the help in its power to further the cause of agricultural education in this country, where the only occupation of the people is agriculture. Rather should it be said that the University has been backward in its action, for it has allowed steps to be taken and hopes and expectations to be raised which cannot be fulfilled till the University has taken the step now proposed.

"4. The reasons, or some of them, why the diploma in Agriculture is necessary are:

"(1) To encourage the study of Agricultural Science in this country, where with the increase of population increased production or emigration must soon be the only two practical alternatives. Emigration is a most unsatisfactory and unpopular way out of the difficulty. Increased production is not only feasible, but it is the duty of the State to foster it. It does not seem necessary to argue the point whether Agricultural Science can be trusted to increase production. It has succeeded in every country where it has had a fair trial.

"(2) To diffuse a knowledge of the principles of agriculture in the ranks of the Revenue officers of the State. These officers are intimately concerned with the condition of agriculture. Their duty is to watch its progress, to help the farmer, and to foster improvements. The advice they now give is as likely to be harmful as beneficial. The Government has to base its administrative action largely on their reports. It is then all-important that a knowledge of the main principles which govern production and stimulate improvement should be diffused among the educated officials of the Revenue Department.

"(3) To aid the Agricultural Department in its slow and patient experiment and research. The want of money demands that this Department should work largely through the Revenue officials. But it needs trained men too, and these it can only secure if the proposed help is given by the University.

"(4) Cattle disease is one of the greatest hindrances to the improvement of agriculture. It cripples the farmers, and there is nothing so necessary as a knowledge of the characteristics of the most prevalent diseases, which would teach the Revenue authorities how to act in the absence of trained veterinarians.

"(5) On these grounds it is contended that agricultural education is essential, and that education cannot be healthy, hopeful, and progressive unless the University extends all the help and encouragement in its power."

I would add a word or two on the importance of Government support to the men who pass through the agricultural course. Unless Government will give employment to these men, they cannot be expected to take advantage of the education offered to them. Government in this country holds in its own hands almost all the posts in which such men could with advantage serve. And I must say that I think that men who have gone through such a course as that prescribed by the University should be at least as useful in the Revenue Department as men who have taken an Arts degree and studied History and Philosophy. I hope that this Conference will express a strong opinion on this subject, and will recommend that a certain number of appointments be annually guaranteed by Government to men who take advantage of agricultural education in the same way that a guarantee is now given to graduates in Civil Engineering by the Department of Public Works.

With some such guarantee of employment to men who enter on the study of Scientific Agriculture, there will be a most healthy competition, which will ensure an ample supply of really good men, and prevent men who have failed in everything else coming forward to take up agriculture as a last resource.

It is to the facts that (1) the Engineering course has been taken up by the University, which was not the case when I first came to the College at

Poona; and (2) that encouragement has been given by Government to graduates in that branch by the guarantee of certain appointments that no less than 65 candidates will appear from the Poona College of Science for the examination for the Degree of Licentiate of Civil Engineering next month at the Bombay University—a result, I should say, almost without parallel in the history of Indian Universities.

With regard to the education of the ryots proper, there are many difficulties, one of the chief being that when you educate a ryot and teach him to read and write, he immediately wants an appointment in Government service as a clerk. However, I think it would be quite practicable to institute farm classes on the larger farms, such as that at Bhadgaon in Khandesh. Such a class did exist there, and I have always understood did much good. But this is altogether a question which the particular conditions of a district only can decide, and which must be left for the Local Governments to adjudicate on.

The advice of the Agricultural Chemist would be very valuable on questions relating to agricultural education, and would no doubt be asked by Local Governments. His advice to the Universities, however, could only be given to a University if he were a member of that University. Those who are acquainted with the constitution of Indian Universities and the independence of the faculties in the various branches will understand that any attempt at interference with their prerogative would result in failure.

The Local Governments can, and no doubt will, appoint the Agricultural Chemist a Fellow of the Universities in their respective provinces, and he can then always bring forward for discussion any points which may to him seem of importance.

Further discussion of the subject was postponed till the following day.

Proceedings of the Agricultural Conference.

Fifth Meeting, Friday, the 10th October 1890.

PRESENT :

SIR E. C. BUCK, KT., *Secretary to the Government of India, Revenue and Agricultural Department.*	President.
HON'BLE W. C. BENETT, *Secretary to the Government of the North-Western Provinces and Oudh.*	Members.
H. F. CLOGSTOUN, Esq., *Commissioner of Settlements and Agriculture, Madras.*	
DR. T. COOKE, *Principal, College of Science, Poona.*	
M. FINUCANE, Esq., *Director of Land Records and Agriculture, Bengal.*	
J. B. FULLER, Esq., *Commissioner of Settlements and Agriculture, Central Provinces.*	
T. H. MIDDLETON, Esq., *Professor of Agriculture, Baroda College.*	
HON'BLE P. NOLAN, *Secretary to the Government of Bengal.*	
E. C. OZANNE, Esq., *Director of Land Records and Agriculture, Bombay.*	
F. A. ROBERTSON, Esq., *Director of Land Records and Agriculture, Punjab.*	
E. B. STEEDMAN, Esq., *Deputy Commissioner, Hoshiarpur, late Director of Land Records and Agriculture, Punjab.*	
R. G. THOMSON, Esq., *Officiating Revenue Secretary to the Government of the Punjab.*	
DR. J. A. VOELCKER, *Consulting Chemist to the Royal Agricultural Society of England.*	
J. W. P. MUIR-MACKENZIE, Esq., *Under-Secretary to the Government of India, Revenue and Agricultural Department.*	

AGRICULTURAL EDUCATION.

Mr. Clogstoun took the chair in the absence of the President, and asked Mr. Middleton to continue the previous day's discussion.

Mr. Middleton : I hope that the majority of those present consider agricultural education a good thing, not merely because "education," but because it is a means of improving Indian agriculture. That it has done so in other countries must be admitted. In Britain, where primary education has been hitherto neglected, higher agricultural education has been a potent factor in the improvements which the present century has witnessed.

It is very much because of the teachings of such men as Davy, Liebig, Lawes, and Gilbert, and the late Dr. Voelcker that the British farmer has been able to meet such results of new economic conditions as higher rates of wages and outside competition.

In other countries, as Sweden, Denmark, and Germany, where primary education has received attention, the skill attained by the people in the manufacture of dairy products and the management of poultry causes some alarm among their rivals in Britain.

I do not think that the conditions in India differ so essentially from those in Europe as to prevent us concluding that what has achieved success in one Continent may be expected to produce good results in the other.

But when I say that we may expect good results from a system of agricultural education in India, I would add that, in order to obtain the practical benefits which we all desire so much, the system of education must be adapted to the classes to be educated.

In suggesting a scheme, the first question is, where are we to lay the foundation? Are we to begin with primary education and work up to higher, or are we

to "build from the top"? My answer is that the latter is the only practicable course, and that for this reason, much as we might desire the contrary, primary education of a kind which will *really benefit agriculture* cannot *now* be introduced into village schools all over India.

Mr. Fuller puts a pertinent question when he asks, "Can we safely aspire to teach agriculture to the ryot," and he answers it by saying, "I do not think that we can venture beyond principles."

I am of opinion that we cannot expect practical results from teaching to boys of the ryot class the *principles* of a subject like agriculture. I do not deny that principles will be learned by the boys in the same way as they learn Persian odes and verses of Shakespeare, and, when so learned, the principles of agriculture may or may not have a similar value to the poetry, but that the boys will be able to deduce from these principles a single conclusion that will really affect their practice in the fields, I very much doubt.

Another cause that makes the teaching of 'principles' in village schools impracticable is that, in order to convey the elementary truths of science to young minds, very special attainments are necessary—attainments which we cannot look for in village schoolmasters.

As an example of the difficulty of teaching elementary principles with success in a country where the higher education of the people presents no difficulty, I would instance Ireland (*vide* Madras Agricultural Committee's Report, page 134).

To produce practical effects, the son of the ryot must see rather than hear, and an essential in training him is a model farm.

He must be shown improved processes, and told "this is right and that is wrong," and until we are able to attach to the village schools farms which are better than those of the average ryots, the teaching of agriculture will produce but few results.

As the production of a "model farm" is the highest ambition of Scientific Agriculture, it must be evident that the establishment of a general system of primary education which will *directly* influence the agriculture of India may follow, but cannot precede higher education.

An excellent example is furnished by Nagpur. Mr. Fuller tells us that there successful primary instruction is being given in agriculture; but what could have been done had it not been that Mr. Fuller himself studied local conditions for a number of years, and further, and I lay stress on this, had it not been for the previous establishment of higher agricultural education at the College of Science, Poona?

With regard to higher agricultural education in India, we are often told that it is not wanted, and that the cultured classes will never take to cultivation; but we have the evidence of Messrs. Finucane, Fuller, and Ozanne that men possessing no previous qualifications, if properly trained, make excellent practical farmers, and in revenue and other work equal or excel their fellows who have had a literary training.

The Conference has resolved to recommend that there should be an increase of experimental farms in the country.

The spread of these farms will cause a demand for highly trained Superintendents, and for the education of suitable men I would propose some such scheme as the following (which is illustrated by references to the Bombay Presidency and University): At the University "Previous" examination, five scholarships of Rs. 10 each per mensem should be offered to students; these scholarships to be tenable on condition that the holders spent first of all two years on a selected farm for the purpose of becoming practically acquainted with agriculture, and with the special difficulties which higher education would help to solve. During residence on the farm scholars would be engaged in actual work, for which they should be paid at current rates.

At the end of two years, provided progress had been satisfactory, the scholarships should be increased to Rs. 15, and the students allowed to proceed

to some qualified college for the purpose of studying Agriculture and the Allied Sciences, and with the ultimate object of obtaining a degree in Science. The number of years necessary for scientific studies would depend upon the course prescribed by the University. For an examination equivalent to the present Bombay diploma two years would be enough, but in the event of a degree being given, a longer period might be necessary.

At the end of the curriculum, probably two out of the five students who obtained scholarships would graduate with credit and enter Government service. The selected men should again return to farm work, and serve as salaried under-superintendents until the Director of Agriculture was satisfied that they were really competent, when they might be appointed to the charge of Government experimental farms.

A similar course, subject perhaps to variation in the relative duration of practical and theoretical study, would, I think, be suitable for Normal School teachers, candidates for Revenue Service, and others.

In teaching for a University degree, I think that the order of study I have indicated will be found most suitable.

A candidate who passes the "Previous" examination of Bombay with credit possesses the sound knowledge of English Language and Literature, Logic, Mathematics, &c., which all Universities demand of their students, and has reached a stage at which he may with advantage specialize. At the same time the education he has is complete in itself, and his studies need in no way suffer from the interruption rendered necessary by his removal to a farm. On the farm, as I have said, the student would be thoroughly trained in the routine work of cultivation, the care of stock, the keeping of farm books, and the general duties of a manager; he would further be brought face to face with facts which he could not explain, and which would raise within him a desire for scientific training, and he would return to college with mind and body alike invigorated, ready to gather from the lectures of his Professors the explanations of the phenomena which had perplexed him during his practical training. If possible, the college in which scientific training is given should be on or near a farm, so that the student, though not engaged in practical work, may keep up his interest in it. It should be the duty of the teacher of Agriculture to see that each member of his class visits the farm regularly. In support of the view that practical training ought to come before scientific teaching, I would refer to the opinions of Professor Jörgensen quoted on page 152 and of Mr. Benson on page 144 of the Madras Agricultural Committee's report.

Mr. Keess of Saidapet has recommended that practical study should succeed theoretical. His proposal—and it seems to me rightly—does not meet with the approval of the Madras Committee. It is of opinion that "theoretical and practical training should go hand in hand." In the course for village teachers at a Normal School, where time is limited and the standard of education low, it is probable that the best plan is to teach practical and theoretical subjects together. The objection to this method is, that idle students make the farm an excuse for neglecting their studies, and that bookworms make studies an excuse for neglecting the farm. And I must say I think it would be too much to expect that men studying difficult sciences should work on a farm all morning, attend college during the day, and read at night. All the practical work that could be expected from hardworked students would be a daily visit to the farm to see what was being done.

The *President* returned and relieved Mr. Clogstoun of the chair.

Mr. Ozanne: I would like to make a few remarks, particularly with respect to the difficulties I see in the way of primary education in agriculture in village schools. I will read the recommendations of the Bombay Committee,* approved generally by the Bombay Government, on the subject of agricultural education, and then the proposals† submitted to this Conference for consideration by an association of Native gentlemen in Poona, most of whom are directly interested in the practice of agriculture, and all in

* Report, dated 8th July 1890 (*vide* Appendix A).
† *Vide* Appendix G.

the advancement of technical as well as general education. I have already distributed copies of the proposals by these gentlemen, who, I may add, met in Poona on the occasion of Dr. Voelcker's recent visit to discuss the various matters on which Dr. Voelcker sought for an expression of native opinion. The Bombay Committee's recommendations are as follows :—

"As to agricultural education and improvement, we will discuss the former subject first.

"It is within the cognizance of Government that the College of Science, Poona, has been enlarged so as to constitute the Agricultural Branch of that College—the Agricultural College of the Presidency,—and that a similar step is being taken in connection with the Baroda College. Both colleges are now affiliated to the University for the Diploma in Agriculture recently instituted by the Senate. Farms are, or are about to be, attached, which will be to some extent experimental, but primarily demonstration farms, on which the students in agriculture can see the staple crops of the locality grown, and can watch experiments. These farms will be respectively under the Superintendent of Farms at Poona and under the Professor of Agriculture at Baroda, each assisted by qualified Assistants. One of the duties of these Assistants will be to hold farm classes on the farms. At Poona theoretical instruction is imparted by a teacher of Agriculture and Botany, as well as by the Professors of Chemistry, Physics, and other kindred subjects. A veterinary hospital is attached to the College to make the lectures in Veterinary Science more practical.

"Thus provision is made both for the theory and practice of agriculture.

"The students are for the most part Brahmans and Parsis, but many, especially from Gujarat, belong to the purely cultivating classes. They are not always or generally youths who intend to farm themselves, but are candidates for the diploma, seeking thereby an entrance into Government service. It is our conviction that the beginnings in agricultural education should thus be made among the educated classes. The successful candidates for the diploma will seek employment in the Revenue Department after the small demand for the Agricultural and Educational Departments has been satisfied. The posts in the last named Department are those of High School teachers of Agriculture and Physics, who are at present men trained at Madras or Poona. They teach the first principles of agriculture common to all systems, and they give some practical instruction on the plots of land specially attached to the schools for this purpose. It is intended that the agricultural classes in the High Schools should feed the Agricultural Colleges, and in some degree this result is being secured.

"We must instruct the educated classes first, so that they may assist in agricultural enquiry. When that enquiry has sufficiently advanced—and it must advance slowly when we consider the great variations due to soil, climate, and situation—it will, in our opinion, be time to take steps to teach the principles of Agricultural Science in primary schools. We must get abreast of the empirical knowledge of the cultivator before it will be safe or useful to allow any teacher to arrogate to himself the right to teach Indian agriculture.

"There is, however, one way of reaching the real cultivators, as desired by the Supreme Government, and that is by inducing them to come as apprentices to the farms. Something has already been done in this direction at the Bhadgaon farm, and some of the apprentices have turned out superior farmers. Nothing, however, of real importance can be done in the way of teaching apprentices till accommodation is provided for them at the farms, and till the number of farms is increased."

The Poona Association's representations are as follows :—

"To the means enumerated in the foregoing paragraphs it is necessary to add general education to improve the condition of the agriculturist. He is lamentably backward in this respect. Ninety-five out of a hundred cultivators cannot read or write, and very few can count up beyond twenty. Village schools should be more thickly spread than they are at present, and besides the knowledge of the three R's, elementary instruction in agriculture, showing the advantages of ploughing, harrowing, hoeing and manuring, the rotation of crops, and the selection of seed, should be given from books specially prepared on the subject. It is necessary that the village teachers should have received instruction in the principles of agriculture, and the subject should be taught to the pupils of training colleges and demonstrated by the working on the zilla farms, to which they should be taken once a week. If practicable, farms may be attached to training colleges, where the teacher will be able to illustrate his lectures more frequently, and get his pupils to do practical work. We are of opinion that the teaching of agriculture in training colleges, the pupils of which are intended for village schools, and some of whom are sons of agriculturists, will be more useful to the people than the teaching of it in High Schools or Colleges to pupils of higher classes whose connection with the agriculturists can seldom be very great or intimate."

You will see that whereas the Bombay Government would prefer confining education in agriculture, for the present at least, to the educated classes, the Association lays more stress on primary education in agriculture. We have all heard with great attention and interest Mr. Fuller's reasons why

primary education may be undertaken in the immediate present. As to the desirability, I am at one with him. I think that from its very nature such instruction has immense power in opening the minds of the young chiefly because it deals with objects of interest to the ryot's son, and its illustrations must come from objects of every-day observation. So it is a practical application of the principles of the Kindergarten object-lessons system of teaching.

I notice again that Mr. Fuller is anxious to confine such instruction to principles. His object is not to teach agriculture, but to use agriculture as a means of educating the mind, and he foresees that it will create an interest in the after-study of agriculture for the sake of improving agriculture itself.

With this object in view, and confining the teaching to these limits, I will raise no objection to agricultural instructions in village schools, provided two conditions are fulfilled :—

(1) That we wait till competent teachers are available.

(2) That we wait till a text book can be prepared.

Mr. Fuller with characteristic energy has already provided the text book for the Central Provinces, and he has secured teachers from the Poona College of Science, so that he may begin at once ; but I cannot claim to be ready with a text book. I feel that I shall want not one, but half a dozen ; for though the principles of agriculture are the same throughout the world, the practice so differs that illustrations, with which the text book must bristle to keep the attention and interest alive, must vary with varying practice. Our enquiries must advance a little. I prefer then to see elementary agricultural instruction introduced into village schools as I advance in agricultural enquiry. When I have completed the minute study of any district, I shall try to follow on with a text book for that district, provision in the meantime being made for the training of a teacher to teach in the vernacular.

I need not say more on this subject, but I think I can assure the Hon'ble Mr. Nolan that we are all interested in primary education. But we are not here dealing with the subject generally, but specially in reference to agriculture. There is no reason why all possible efforts to increase general primary education should not be made. All we say is that as the facilities for extension of village schools increase, so the attempt should be made to make the best use of the facilities by superadding a subject which will induce the ryots' sons to go to school. I might say that it is not in the number of schools that we are behind hand so much as in the number of scholars, and Mr. Fuller's scheme for primary agricultural education will just give the fillip required to fill the schools and make them popular.

I turn now to the subject of higher agricultural education. I fully agree with the Hon'ble Mr. Benett and Dr. Cooke that the most urgent necessity exists that the Universities should recognize the special needs of this country for education of the highest scientific and practical character in agriculture.

The action of the Senate of the Bombay University in instituting a diploma of Agriculture shows that it is recognized by the Bombay University that the higher teaching of agriculture may now be ranked with the teaching of literature.

Till the Universities everywhere recognize the claims of Agricultural Science, all efforts to induce the educated classes to enter the affiliated colleges in order to qualify as scientific agriculturists will be wanting in results I need not before this Conference try to prove that a degree in Agriculture can, and should, prove as high a standard of education as a degree in Law, Medicine, or Engineering.

The first result of a degree in Agriculture will be that graduates in agriculture will in the ordinary course seek to join the revenue ranks, and I need not repeat the reasons which have already been urged by other speakers for the desirability of leavening the Revenue service with such men.

I am not one of those who think it is a reproach to the country that men will not join the Colleges in their agricultural branch without the

stimulus of Government employment. When the instruction is first-rate and full, the successful students will command respect from practical agriculturists; and it is not rash to say that when educated men are available as land agents in this country, they will find employers other than Government. A capitalist who invests in land has now no other way of managing his lands than through the cultivators as tenants under the many systems which are met with. But when capitalists see that they can get more out of their lands by employing an agent to supervise the tenants, I think that they will readily employ them. It will give them security sufficient to induce greater improvement. Thus, then, the higher education in agriculture will not only supply the men which Government in its various departments either needs or desires, but will make land agents for private employers available. There is no reason to believe that large landholders will not in time prefer to educate their own sons to be competent land agents. This is very desirable in the interests of agricultural improvement, and will come, however slowly, if Government makes provision for thorough education, scientific and practical. But no such result will be evolved without the initiative of Government and the cordial co-operation of the Universities.

The instruction in higher agriculture must be practical as well as scientific. No doctor will get private practice if he cannot himself be trusted to perform surgical operations. The difference between a graduate in Agriculture and in Medicine is that, provided the former thoroughly understands his practice, he need not be called on to perform all operations personally as the surgeon must: we may see some encouragement in this. Educated men in India *have* qualified as surgeons and as veterinarians, and have come forward when the inducements have been adequate; they will come forward more readily to qualify as scientific farmers when Agricultural Science is recognized as not inferior, but as equal in dignity and utility to any of the sciences now encouraged by the Universities.

The resolutions of the Conference on the subject of the appointment of an Agricultural Chemist and on the institution of experimental and educational farms will provide for the practical side of the instruction; and I most fully concur with the decision of the Madras Government that no graduate should be put in charge of an experimental farm who has not served an apprenticeship in practical agriculture. How this can be best effected must be left to the various Departments of Agriculture to study.

I must not omit to notice other important educational functions of Government farms, and I refer again to the recommendations of the Bombay Committee, *viz.*, that *bonâ fide* ryots should be induced to send their sons to the farms as apprentices. Even here Government may encourage them by giving them posts as overseers and makadams on farms, for the farms need such men; and in making provision for the wants of the farms, it is possible to reach the ryot directly. Many will be tempted by the prospect of Government service, but some will learn that greater profit is possible in farming on their own account, and will leave Government service to farm for themselves.

Mr. Robertson enquired if the Agricultural Primer was taught throughout primary schools in the Central Provinces.

Mr. Fuller thought it was, but that it was optional at present, though it may be made compulsory hereafter.

Mr. Muir-Mackenzie: Observed that the value of agricultural education, more especially of the primary class, had been considered in its relation to the possibility of effecting improvement in the practice of agriculture. The illustrations quoted by Mr. Steedman from the Jhang and Rawalpindi Districts on this head had been taken to imply that there were classes of cultivators upon whose methods little improvement could be obtained. Mr. Muir-Mackenzie, however, understood that these instances were cited to indicate not the impossibility of effecting any improvement, but that the ryot was not as indifferent or blind to the imperfection of his practice

as was alleged, and that, if the way were open to him, he was not less ready to take advantage of his opportunities than any other class of men. The speaker concurred with those gentlemen who had stated their belief that one of the most effectual ways of bringing about agricultural improvement was to teach to the bad cultivators the methods of their neighbours. To show that a wide field existed for such efforts, he referred to the Jain and Mahratta cultivators in the Krishna Valley, the lands of the former exhibiting the most elaborate and careful tillage interspersed among fields of the latter, which often remained unploughed for two or three seasons in succession. Whether much would be soon or directly effected by teaching in primary schools he felt doubtful. It would not be denied, he thought, that the proportion of absolutely illiterate agriculturists was exceedingly large. He had observed when visiting village schools in Bombay that, while the large proportion of scholars were non-agriculturists, the agriculturist scholars were far the most backward, and left the schools before attaining to the higher standards. He also thought it obvious that if agricultural knowledge was to impress itself generally upon the rustic classes, they must at least learn generally to read and write. For the introduction, therefore, of agricultural improvement among the cultivators themselves, he relied more on experiment and demonstration than upon agricultural teaching in primary schools. He did not, however, see the necessity of awaiting fully qualified teachers before introducing Agricultural Primers. On this point he agreed with Mr. Finucane. There was no harm, and there might be good, by learning to read from a book which taught agricultural truths, rather than books which taught him information which received no illustration from the life around him.

As regards both middle class and higher education, he considered that one of its most useful and legitimate objects was to introduce into Government employment a set of men who had received education in the theory and practice of agriculture.

As an exemplar of middle class education, he was ready to take the Nagpur College and Farm, which dispersed over the districts Revenue or Settlement Inspectors trained in agricultural subjects. Such men would not always, or perhaps even generally, make direct use of this knowledge. But the exceptionally zealous among them would have an agricultural foundation to work upon, from which agriculturally useful results would ultimately follow, whereas the ordinary Arts matriculate would have little or nothing to tell the cultivator that he would under any circumstances care to hear. He did not understand why Dr. Cooke had hinted that the demand for agriculturally educated teachers must for some time be small. He ventured to think it should be very extensive, particularly if the introduction of Agricultural Primers was to await the supply of qualified teachers. No large school ought, he thought, to be without some one teacher, Assistant or Head Master, who had passed in agriculture.

With reference to the higher education in agriculture, he wished first to observe that he could not question the strong desirability of agricultural training for the higher class of officers in the Revenue and similar Departments. Such training had lately been prescribed as part of the curriculum for passed candidates in the Covenanted Civil Service. The use of a tahsildar or mamlatdar thus trained he thought obvious. In Bombay at least the mamlatdar had a considerable influence in the distribution of takavi and in the management of local funds. Such an officer, if well educated in agriculture, would be stimulated to use these powers for its improvement. One reason perhaps why there had been hesitation in holding out inducements in the way of Government employment to men whose education had been agricultural was that there was an uncertainty that the tests would be as searching and severe as in other and longer established branches of education. There had been in the past some foundation for this fear. But with the guarantee afforded by the University degree and with the advice of a highly qualified Agricultural Adviser, there should be every security that a course of study comprehensive and exacting enough to satisfy all requirements would be prescribed. His personal experience and observation of successful men at Cirencester

convinced him that the mental application and powers required to obtain the diploma there were in no way inferior to that required to obtain the University Honours with which the diploma was compared. Though at Cirencester there was undoubtedly a great difference between the man who scraped through and the man who came near or got the medal, it did not exceed that between the University 3rd and 1st class men. In short, he confidently maintained that Government could look for as adequate a mental equipment from the men who took a properly instituted Agricultural degree as from those who obtained the existing degrees in Arts, Science, Law, or Medicine. If this was not agreed in, let it be remembered that it was easy to introduce agricultural subjects as part of the test required for degrees in the faculties already existing, such as those of Civil Engineering.

Higher education and University degrees in every subject whatever were admitted to be looked on for good or evil by the natives of this country as stepping stones to public employment. The only material exceptions were Law, and, perhaps to a less degree, Medicine. But even in these two cases how many men looked forward first to a pleadership or private practice? How many of the native doctors or vakils were anything but Government surgeons or munsiffs "manqués?" This being so, why should any reproach attach to the proposed higher agricultural education because it would at first anyhow be regarded in the same light? He maintained that as it will be useful to have in the public service Art, Law, and Science graduates to increase its efficiency in those fields, so will it be useful for it to contain Agricultural graduates, who would increase its efficiency in the field of agriculture. The Government's need hold out a comparatively small amount of inducement. In Bombay five appointments had attracted 65 candidates for the degree in Civil Engineering. It must be remembered, however, that, but for these appointments, probably not a man would turn his attention to the subject. Every one would have run on in the old groove. This is what it is important to prevent, and for this purpose he hoped the Conference would affirm the principle that Governments should allot a definite number of appointments to men who had passed certain definite high tests in agriculture.

Nothing could be more certain than the danger alluded to by Mr. Fuller that agricultural education might become unpractical. At the Diploma examination at Cirencester each candidate had a whole fortnight's work in the Chemical Laboratory; he was taken on the farm by two practical farmers unconnected with the College, as well as by the Professor of Agriculture, who gave him a raking *vivâ voce* in all his weak points. He thought nothing less severe ought to be thought of in the courses adopted in this country. In the Poona College, with which he was most familiar, he should like to see students before being passed given a bad half hour or so with men like Mr. Middleton or Mr. Ozanne, assisted by a Committee of good cultivators, such as the neighbourhood of Poona would have no difficulty in supplying.

Lastly, he thought that as for some time to come Universities in this country would not have 1st class agricultural experts of their own to draw up their syllabuses and prescribe their courses, it should be a recognised function of the Agricultural Adviser to assist or, even if it could be so arranged, to prescribe such parts of the course as were essential in every province, to recommend text books, and set at least some of the examination papers, even if he had not time to look them over.

Mr. Finucane thought we should work not only from above downwards, but from below upwards. In the Madras report (page 134) it is stated that in Ireland (which in some respects resembles India in regard to the backwardness of agricultural practice) the study of Agriculture is compulsory in all rural schools of the fourth and higher standards. The Superintendent of Glasnevin and Inspector of Agricultural Education considers that teaching even from mere text books is of some benefit. The boys learn practice in their father's farms and principles at schools. The boys may not understand these principles, but they will carry them away, and turn to them for instruction later in life. This is the testimony of Professor Carrol, Professor Tanner, and Professor

Baldwin in Ireland. He therefore thought that primers should be introduced without waiting for teachers, but he was, as he had already stated, strongly of opinion that teachers should also be trained, and instruction by them would no doubt be better than mere instruction by text books or readers. He was of opinion that a demand for agricultural education is arising in Bengal, and there is no part of India where such education is more likely to be fruitful of good results.

The *President*: Before calling on Dr. Voelcker to address the Conference, I will make a very few remarks on one or two questions which have been raised. It has been implied that because the students at those agricultural institutions which exist go off to other vocations, that so far the institutions fulfil no sufficiently useful end, *i.e.*, no end justifying the expenditure under the head of agricultural education; and Mr. Steedman has in this connection suggested that practical education should be limited to the larger landholding class.

It would seem, however, necessary to bear in mind that students go off to other vocations because there are not at present sufficient openings in a strictly agricultural direction. If, however, a scheme of agricultural education is developed, trained students will be wanted, as Dr. Cooke shows, as instructors. The evidence before us indicates that they will be largely required in this capacity. They will be also needed, as the Hon'ble Mr. Benett indicates, to leaven the ranks of native officials on the administrative staff. And in confirmation of this view, it is satisfactory to learn that the officials who have received a practical education are in two provinces considered to have proved distinctly more useful officers in general executive administration than those who have received a merely literary education. There is very little opportunity under the existing system of education for students to acquire the habit of observation and of turning the results of observation to useful account. If this element is introduced into the educational system through the medium of agricultural schools or classes, it will, to use the Hon'ble Mr. Benett's words, tend to leaven the administrative staff, not merely in direct connection with agricultural improvement, but rather in providing the Government with officials who know how to use their eyes and hands. Other sections of the educational scheme might, it is true, be utilized for the same purpose, but considering the very close connection of agriculture with the whole of our administration, as well as the fact that the bulk of the State revenue depends upon agriculture, that particular branch of study deserves to be selected as the special one which should be utilized to introduce a practical element into our educational system.

It may also be suggested that the larger landowners would be less likely to accept any offer to accord to them a practical agricultural education if their early training had had no connection with the subject. At the same time it may be admitted that Mr. Robertson's remarks, in which he deprecates the too rapid multiplication of high class colleges, are in this connection useful. We should not attempt to turn out practical agriculturists in excessive numbers. We should consider the demand as well as the supply.

What Mr. Robertson has said on this subject confirms the views of the Government of India as expressed in the fourth paragraph of the despatch to Her Majesty's Secretary of State, dated 21st July 1888, of which I ask leave to remind you by the following quotation :—

"We hold it to be a mistake in the present backward condition both of the technical training of the country and of its financial resources to encourage in any single province excessive expenditure on scientific teaching or experiment of a highly technical character. We consider that for some years it will be sufficient to establish one or more centres at which the more advanced technical sciences of Europe can be taught to the natives of India. As time goes on, men will be found who, born and bred in this country, will avail themselves of the opportunities thus created, and will be of sufficiently high intellectual capacity to enable them to communicate to a larger number of their own countrymen the knowledge which they have themselves been taught. We apprehend, moreover, that the method of confining high-class training of a technical character to single provinces would lead, on the one hand, to the multiplication of inferior training establishments and to unequal results; and, on the other, to the complete exclusion from the country of really 1st class scientific instruction. In this view we are guided by the experience of the larger countries of Europe in which the training institutions of first rank are national, and not provincial or local."

I entirely follow the Hon'ble Mr. Nolan in placing initial importance upon primary education. Any scheme of agricultural instruction must depend more upon establishment of sound and widespread primary education than upon anything else. And it is possible and useful, as has been indicated by many of the speakers whom I follow, to give even to primary education a turn in the direction of agricultural subjects. But primary education is, and must be, in all provinces supplemented by instruction of a higher character, and all that we contend for, I understand, is that agriculture should be one of the most important subjects to which both in the primary and in subsequent stages of the educational course the attention of students should be directed. This is not the case now. The words which the Hon'ble Mr. Nolan has quoted from my note that "everything else in the world is taught but agriculture" are justly open to criticism. I should have said that, "whatever else is taught, it has no connection with agriculture." But in any case I ask that the remark now quoted may be read with the final clause in the next paragraph of the note, in which it is suggested that the minds of our students are led away from agriculture "by the literary character of their instruction, too closely restricted, as it seems to be, to History, English Classics, Mathematics, and other subjects of an academical character."

One of the most gratifying and hopeful facts which has been brought to our notice is that related by the Inspector General of Education in the Central Provinces in connection with the lectures on agricultural subjects, which, he says, if I remember rightly, were not only listened to with interest by the pupils, but voluntarily attended by their friends and relations of an older generation. It is only natural that it should be so. Every human being likes to be told about things which surround him; about subjects in which his thoughts are already interested, and which are not beyond the grasp of his mind on account (to use a word which I have seen coined) of their "far offness." I am a constant visitor to the Indian Museum at Calcutta. Hundreds of country people wander daily through its rooms. But there is no show case so crowded, none round which the country visitors spend so much of their time, as the clay models representing the simple agricultural operations in a village. Although these are nothing more than a representation of what they see every day, the very familiarity of the subject attracts them to a much greater degree than the far more wonderful, but to them strange and unintelligible, exhibits by which the clay villages are surrounded. So with education. Should not our educational scheme seize upon a subject which acts as a bait, as it were, to the uneducated masses, and which will tend to bring within the educational net such sufficient numbers of the rural classes as will swell the percentage of the educated coteries to a level which will satisfy the most ardent advocate of primary education?

In conclusion, I ask you, although perhaps I need hardly do so, to listen with deference to Dr. Voelcker's views and suggestions on the important subject of agricultural education. Dr. Voelcker has in the opportunity which he has enjoyed of prolonged personal communication with yourselves or other officials of the Agricultural Department in each province, as well as an experience which has for a period of several years brought him into connection with subjects cognate to the question before us, advantages which none of us possess. But more than this. Whatever views Dr. Voelcker has formed will, in regard to the fact that he has been specially deputed to India by Her Majesty's Secretary of State in order that his opinion and advice should form the basis of the agricultural scheme (inclusive of agricultural education), be accepted as carrying with them exceptional force. From what has already passed at this Conference the satisfactory conclusion may be drawn that Dr. Voelcker's views are already in accordance with the general views held by those present, but it would seem desirable that, so far as this is the case, some positive expression of opinion should be placed on record in the form of resolutions. The Hon'ble Mr. Nolan has already expressed his desire to submit one resolution in favour of primary education, and I could invite Dr. Voelcker, and thereafter any other member who may wish to do so, to follow with such other resolutions as they may deem likely to meet with general acceptance.

Dr. Voelcker: The discussions of previous days have been concerned with points to which, according to the programme laid down for my guidance, my

attention was to be specially drawn, and upon which, if I may say it, my opinion after careful study might be looked to as carrying some weight. We have also, I am happy to think, come to an unanimous agreement with regard to the utilisation and teaching of Agricultural Chemistry, and it is with considerable satisfaction that I find the plan I sketched out meets with general approval.

The larger question of agricultural education is one in which I cannot help feeling deep interest; but, though in the course of my investigations I have watched its condition, so far as opportunity was afforded, and formed certain opinions about its further development, it is with great reservation I put these forward, for I feel that in considering agricultural education it cannot be dealt with alone, but only in relation to education generally, and to treat of that necessarily implies a far wider knowledge of the country, of the people, and of systems than I could possibly gain in the short time I have had.

The main points that arise appear to me to be these:—

(1) Is special teaching in Agriculture desirable?

(2) Should it proceed from above downwards, or from below upwards?

The first point you have already expressed a decided opinion upon, and I concur in the desirability of making the teaching of agriculture part of the system of primary education. The reasons have been so fully given by other members of this Conference that I will not go into them further, but confine what I have to say to the second head.

I am distinctly of opinion that in order to ensure that the teaching given in elementary and middle class schools be of an efficient nature, and if by means of it we hope to reach the cultivating classes, the source from which the teaching power springs must be put on a high level, and we can never look to the stream to flow healthily throughout the country unless the fountain head be pure.

In the course of my second tour I have been considerably impressed by the useful work done by some of the local agricultural classes established through the energy of individuals holding official positions, but I have found these classes to be dependent for their teaching agency entirely on higher educational institutions; so, too, has it been in the case of the immediate supervision of experimental farms and stations. The Nagpur Agricultural Class, *e. g.*, is dependent on the teaching given at Poona; the Cawnpore, Saidapet, Bhadgaon, Seebpore, and other farms on instruction imparted mainly at Cirencester.

For such reasons, I venture to think we need to pay special attention in the first place to the agricultural training at colleges being good, so that wherever agricultural education spreads, it may be good in quality, because good in its origin; and that we should aim at this rather than hope to rise from acknowledged imperfection and error to comparative truth. Similarly, when a subject so essentially practical in nature as agriculture is concerned, we should make it a *sine quâ non* that it should be dealt with *ab initio* in a practical manner.

As to whether special agricultural colleges should be established in greater numbers or not, I think that, seeing we are only just entering, or proposing to enter, on a plan by which agricultural knowledge may be introduced into the present educational system of the country, it would be the wiser policy to make use of existing institutions at which science forms a part of the course, and tack on agriculture as one of the subjects taught, rather than to start fresh colleges purely for the teaching of agriculture. It should be made to form part of the existing scientific instruction of colleges rather than take the place of it. Nor do I think there is a call for such special institutions, nor could they at the present time be properly equipped so as to adequately provide for instruction in the various branches of a complete agricultural curriculum; the expense, too, would be very great, whereas if existing institutions be utilised, the teaching given in each science can at the same time be made use of for those studying agriculture specially. It would be comparatively

easy to provide a well qualified teacher of agriculture as an addition to an existing college staff and system.

Suppose this done, another essential remains, *viz.*, to provide a farm for demonstration purposes, and land upon which the students are to work with their own hands.

From centres such as these we may look for a certain number of men who, as occasion arises for the establishment of local agricultural classes, will be available as teachers, and carry with them the lessons of practice with science which they have learnt in the higher institutions. Going lower down, we may look for some who have gone through such classes to provide the teaching power for schools of various grades, and, finally, by the education in agriculture of the teachers in elementary schools, it will be ensured that the teaching given is on a sound basis, and not merely theoretical but practical. In this way alone we may look to ultimately reaching the cultivating classes. Whether it be a high, middle, or elementary school, wherever it is possible, demonstration by means of a farm or field should accompany the teaching; and it is essential that to every college or agricultural class lands for conducting the actual tillage and cultivation operations by the pupils themselves should be attached in addition. Mere teaching out of a text book by persons practically unacquainted with the subject they assume to teach will avail nothing, and teaching unaccompanied by practical demonstration will fall short too of accomplishing the right end.

It may be said that the great majority of those who will study agriculture at colleges will do so simply in order to obtain Government employ. Though this appeared to me at first a potent objection to the spread of agricultural education, I am not disposed now to consider it as such, but to agree with those who have urged that, even if this be so, it is a great advantage to secure in the Revenue service those who have had an agricultural training, and that they will form far more useful officers than those whose training has been a purely literary one. Unquestionably a scientific training tends to habits of observation that cannot help proving useful to a man so employed; and where, as in the case of the Central Provinces, there is a constant call for men of this class, the advantages must be patent. The call for employment of men of this kind in Government service supplies alone, therefore, sufficient justification for the introduction of agriculture into the educational system.

Nevertheless, in providing for additional instruction in agriculture, we should keep strictly in mind the number of men for whom occupation is likely to be readily found, and where a knowledge of agriculture will be of use to them. There is also to consider that, if the pupils of our colleges and schools do not go into Government employ, they are provided with a training which they can turn to practical account, and they are thus in a better position to utilise what they have learnt than had their education been purely on the lines of the B. A. or similar degrees.

The connection between colleges where an agricultural course exists and a University is a very desirable one, and the students successfully passing through it should be on the same footing as graduates in Arts, &c. A mere diploma, such as exists at Poona, is not sufficient or satisfactory.

As regards agricultural education in colleges, I am inclined to think that where it has been introduced already, there is a tendency to hamper the agricultural course by the inclusion, and for too long a period, of too many subjects not so immediately connected with agriculture. It is certainly right to insist on certain qualifications being reached in Mathematics, Physics, &c.; but this might be done before a student enters upon agriculture as a special subject, and having obtained the necessary qualification in these, he might proceed with the main subject—agriculture—in its more immediate relations.

Thus a *first* year's course might include—

Mathematics.	Elementary Botany.
Physics.	Elementary Geology.

General Chemistry;

while a *second* year's course might be given to—

Chemistry.	Biology (including Plant Physiology).
Practical Chemistry.	Agriculture.

Drawing;

and a *third* to—

Agricultural Chemistry	Surveying.
Agriculture.	Veterinary Science.

Agricultural education should be in some way connected with the Agricultural Department possibly through the Director of Agriculture. It will also be a useful function, which the suggested "Agricultural Adviser" to Government can perform, to watch the progress of agricultural education, and for him with this view to visit the various institutions where it is provided for.

The following resolutions were then put before the Conference :—

1st resolution.—Proposed by the Hon'ble Mr. Nolan; seconded by Mr. Robertson—

"In considering the question of agricultural education and progress, the Committee desire to express the opinion that it is most desirable to extend primary education among the agricultural classes.

Carried unanimously.

2nd resolution.—Proposed by the Hon'ble Mr. Benett; seconded by Mr. Steedman—

"That, as a general rule, instruction in agriculture should be combined with the existing course of education, and not depend *exclusively* on separate special institutions."

Carried unanimously.

3rd resolution.—Proposed by Mr. Ozanne; seconded by the Hon'ble Mr. Benett—

"Resolved that it is most desirable that the Universities should recognize the Science of Agriculture as an optional subject in the course for a degree."

Carried unanimously.

4th resolution.—Proposed by Mr. Fuller; seconded by Mr. Finucane—

"That it is very desirable that the elementary principles of agriculture should form a prominent subject in the education which is given in village schools with the view of creating more interest in agricultural improvement amongst the cultivating classes.

Carried unanimously.

5th resolution.—Proposed by Mr. Ozanne; seconded by Mr. Finucane—

"Resolved that, in order to secure the object of the last resolution, it is desirable to take early steps to provide suitable teaching, the best books and "readers."

Carried unanimously.

6th resolution.—Proposed by Mr. Cooke; seconded by the Hon'ble Mr. Bennett—

"It is highly desirable that the claims of men trained in Scientific Agriculture to appointments in the Revenue and cognate Departments should be as freely recognized as those of men trained in Law, Arts, and Engineering."

Carried unanimously.

7th resolution.—Proposed by the Hon'ble Mr. Nolan; seconded by Mr. Robertson—

"That where appointments in the Revenue or cognate Departments are made on the result of competitive examinations, Scientific Agriculture should be included as an optional or necessary subject in the examination course."

Carried unanimously.

8th resolution.—Proposed by Mr. Steedman; seconded by Mr. Thomson—

"Resolved that in any province in which it may be determined to introduce a scheme for higher agricultural education, no arrangements will be satisfactory which do not provide (1) for a thoroughly practical training of the students in the field and laboratory as distinct from theory or practice as taught in the lecture room, and (2) for examination tests of a special and searching character in the above branches of work."

Carried unanimously.

Mr. Thomson proposed the following amendment to the sixth resolution, but it was not seconded :—

"In any province in which special facilities are offered to men trained in Law, Arts, or Engineering to enter the Revenue or any cognate Departments, it is desirable that similar facilities should be offered to men trained in Agricultural Science."

Proceedings of the Agricultural Conference.

Sixth Meeting, Saturday, the 11th October 1890.

PRESENT:

SIR E. C. BUCK, KT., *Secretary to the Government of India, Revenue and Agricultural Department.*	President.
HON'BLE W. C. BENETT, *Secretary to the Government of the North-Western Provinces and Oudh.*	Members.
H. F. CLOGSTOUN, Esq., *Commissioner of Settlements and Agriculture, Madras.*	
DR. T. COOKE, *Principal, College of Science, Poona.*	
M. FINUCANE, Esq., *Director of Land Records and Agriculture, Bengal.*	
T. H. MIDDLETON, Esq., *Professor of Agriculture, Baroda College.*	
HON'BLE P. NOLAN, *Secretary to the Government of Bengal.*	
E. C. OZANNE, Esq., *Director of Land Records and Agriculture, Bombay.*	
F. A. ROBERTSON, Esq., *Director of Land Records and Agriculture, Punjab.*	
E. B. STEEDMAN, Esq., *Deputy Commissioner, Hoshiarpur, late Director of Land Records and Agriculture, Punjab.*	
R. G. THOMSON, Esq., *Officiating Revenue Secretary to the Government of the Punjab.*	
DR. J. A. VOELCKER, *Consulting Chemist to the Royal Agricultural Society of England.*	
J. W. P. MUIR-MACKENZIE, Esq., *Under-Secretary to the Government of India, Revenue and Agricultural Department.*	

AGRICULTURAL EDUCATION.

The *President* called upon Mr. Finucane for the rider he proposed to the last resolution passed at the previous day's meeting.

Mr. Finucane proposed the following, which was seconded by Mr. Muir-Mackenzie:—

"Further, that it is desirable that it should be considered whether a certain percentage of the appointments mentioned in the previous resolution of all grades should not be reserved for candidates who have passed prescribed agricultural tests, or whether at least a preference should not be given to such candidates."

Mr. Finucane, in proposing the above resolution, pointed out there was no security that appointments in the Revenue and cognate Departments would be reserved for men who passed the agricultural tests, *e.g.*, in Court of Wards and private and Government estates in Bengal.

The *President* agreed with Mr. Finucane. He thought that, unless Mr. Finucane's resolution were adopted, nothing would induce men to go up for agriculture with a view to taking up Government appointments.

Mr. Clogstoun pointed out that the Madras Committee had gone so far as to suggest that "a knowledge of agriculture would be of great advantage to a Revenue Inspector," and to recommend "the gradual introduction of a rule restricting such posts to persons who have obtained the preliminary qualification certificate in agriculture."

The *Hon'ble Mr. Nolan* thought that the resolution should take the form of a suggestion for the consideration of Governments making appointments. The Conference was hardly in a position to arrive at a definite conclusion.

Mr. J. B. Fuller was not present at this meeting.

Mr. Robertson thought the resolution would commit Local Governments to appoint men who had a degree.

Mr. Thomson, seconded by Mr. Steedman, proposed the following amendment to the resolution :—

"That after the word 'desirable,' the following words be inserted, *viz.*,— 'in any province in which appointments are reserved for persons who have obtained a degree in Arts or any similar educational distinction.'"

Mr. Finucane thought the proposed amendment would be inapplicable to Bengal, in which appointments are not reserved for persons who have obtained a degree, but are obtained either by competition or favour.

The *President* agreed with Mr. Finucane, and thought that the proposed insertion would also be inapplicable to some other provinces.

The *Hon'ble Mr. Benett* did not think that the original resolution would do much harm. It would in his opinion be inoperative.

Mr. Ozanne said that in Bombay, in order to secure a high standard of education among mamlatdars, many appointments have already been reserved for graduates.

The *Hon'ble Mr. Nolan* objected to the amendment on the ground that it would have the effect of limiting the consideration of the proposal contained in the resolution to those provinces in which an educational test of the nature referred to was in force.

The *President* agreed with the Hon'ble Mr. Nolan.

The amendment was put to the vote, Messrs. Benett, Steedman, Robertson, and Thomson voting for it. The amendment was rejected.

The original resolution was then put to the vote, and carried by a majority of seven to four. Dissentients : Messrs. Benett, Steedman, Robertson, and Thomson.

The *President* then called upon Dr. Voelcker to state before the Conference his suggestions regarding the appointment of Agricultural experts.

Dr. Voelcker : There is one matter which, inasmuch as I intend to make it a prominent feature in the recommendations of my final report, I think it is only right I should bring before the Conference now. It is true that even the scheme which the Government of India, we hope, will now recommend for the fourth time has not yet obtained the sanction of the Secretary of State, and that it is not likely he will be disposed readily to grant further expenditure. But my object in coming to this country is, I take it, not only to indicate what can be immediately done, but also what in my opinion must be the line of future development of agricultural improvement.

For the suggestion I am about to make, I find very strong support in the different memoranda which have been handed in to this Conference ; it is the association with our present Directors of Land Records and Agriculture of trained experts to whom the practical agricultural work of their appointments may after a time be entrusted.

I am sure I shall be allowed to say it even in such an assembly as this that, as a rule, a Director of Agriculture has not, with his many and varied duties, the time, even if he had the technical knowledge, to give to the practical business of the agriculture of his province, and that in all but a few instances the technical knowledge requisite for a study of that agriculture, so as to become really acquainted with its sufficiencies and deficiencies, is wanting, certainly at least for the early part of his assumption of his office. Nor can it, so far as I see, be otherwise, for there is no obligation whatever on those who become in the future Directors of Agriculture to study Agriculture or its Allied Sciences, nor is their training in it after arrival in India made a necessity or even a desideratum. In the course of settling a district, an officer must obtain some amount of knowledge respecting the agriculture of the district he settles, but even this is not made a necessary qualification for holding the post of Director of Agriculture. It is, moreover, something very different from the careful and minute study of the details and systems of cultivation, of agricultural practices, and conditions, which is, in my opinion, the

main thing from which we must look in future for agricultural improvement to take its rise.

Agriculture is distinctly a technical subject, and it is not reasonable to suppose that any man, however able, can successfully deal with it unless he has the requisite technical knowledge. We have clear evidence of this even in India, where some Directors of Agriculture have shown considerable ability in dealing with strictly agricultural matters, and in each case it has been, I maintain, because of their previous study of and love for the sciences closely connected with agriculture, and the practical knowledge they either had before or have specially acquired afterwards. As matters stand, it is hardly likely that this will, or can, be the case in any but a few instances, and when, as now, the appointment of Agricultural Director is a changing one, it is seldom that a special training such as might be acquired by sending Civil Servants home to Cirencester would be justified.

It is allowed, I believe, that for a Director of Agriculture to maintain properly his land records and do his work of inspection, besides seeing to the various administrative matters that fall to his share, his time is, as a rule, fully taken up, and the office work of his appointment is quite enough to prevent him, even had he the inclination, from turning his attention to matters of practical agriculture and agricultural improvement through a better knowledge and understanding of it.

The importance of the acquirement of this knowledge of the agriculture of the country has often been drawn attention to, and it remains still a fact that our inability to improve agriculture arises largely from a want of our knowledge of it, its methods, and its needs.

Some, despairing of its ever receiving treatment at the hands of Agricultural Departments as at present constituted, have suggested the abolition of the Department and the creation of a fresh one where the expert shall be supreme. I do not suggest any such thing, for I recognize fully the administrative needs of the country and the ability of the officers of the Government for discharging their high duties—duties which, even in the position of Director of Agriculture, are many more than that of being practical agriculturists, and could not be discharged by such experts alone. At the same time it cannot be denied, I think, that frequently our Agricultural Directors fail in being what the title would imply from a want of technical knowledge; and were this at their disposal, the position they occupy could very possibly be made much more practically useful, and benefit accrue to agriculture and the country. It is for these reasons I have, on a careful consideration of the subject, been led to suggest not an alteration or remodelling of the existing Agricultural Department or the office of Director of Agriculture, but the *association* with the Director of a trained expert, whose duties shall be purely agricultural and practical, and whose position shall be that of Assistant to the Director, and to whom will in time be entrusted the practical work of agricultural enquiry for which his training has fitted him. Such a man would, I believe, be of invaluable assistance to an Agricultural Director, and would provide him the means of paying attention to the practical side of agriculture, and supply the want of technical knowledge which has often been the subject of comment. Such a man would, to take an instance, be available for being sent (under the Director's orders) into any particular district, there to make a careful study of its agriculture from the practical side of any special mode of culture, and to carry out an investigation as to whether a process found beneficial in one district could be successfully transferred to another. Being unhampered by office work, he would be free to spend his time among the people themselves to get an acquaintance with them and their methods, which few could obtain, and, being directly under the Director of Agriculture, there would be the assurance that he was occupying his time well, and the experience and information he gained would be for the benefit of the directorship, and the making it more practically useful to the people. I cannot help thinking that few things would do so much practical good as stirring up the interest of the people in this way, and by showing them the interest taken in them; while few things would tend so much to make the office of Director of Agriculture really useful and give a practical turn to it.

What I have advocated, and the necessity of it, has already been practically recognized, *e.g.*, in Madras by the employment of Mr. Benson, in the North-Western Provinces of Mr. Muhammad Hossain, and in Bengal of Mr. Sen, Mr. Basu, and other Cirencester scholars. But all of these have worked under difficulties; none have been recognized as set apart for the purely practical work of agriculture; all have had office and multifarious duties to perform, or, as in Bengal, have been after a time shifted to other appointments. What I should like to see is in recognized association with Directors of Agriculture a man who has made agriculture a study, and who will make it the business of his life. The importance of such a man in any continuous enquiry is great, and it would be a real step to our getting a definite knowledge of the agriculture of the country. The various notes placed before the Conference point unmistakably to the utility and need of such experts.

[Dr. Voelcker then read extracts from Sir E. Buck's note, the Bombay note, Mr. Fuller's note, the Madras note, the Bengal note, and the Poona Agricultural Association's note.]

Dr. Voelcker: All these extracts, and many others I could name, point to the need of the employment of such an expert as I have named to act in concert with the Director of Agriculture.

If asked to enter further into details, I would indicate that the kind of man to be chosen for such a post is the class that would have passed through a training such as that given at Cirencester or similar institutions, followed up by—and this is essential—subsequent practical experience on a farm; such men, *e.g.*, as would have passed the Surveyors' Institution examination, and be qualified to act as land agents and managers of estates. The reservation as to practical experience is in my opinion so all-important that it constitutes my reason for advocating the employment, at first at any rate, of European rather than Native Assistants, though it is quite possible that natives will occasionally be found with the necessary qualifications. A Cirencester course alone, not followed up by practical experience on a farm, is not sufficient to qualify a man for duties such as I have indicated.

His course of training in agriculture would be very similar to that of the Forest students in forestry, and I should propose to put him on somewhat similar basis as regards salary, &c. At first he would be Agricultural Assistant, and directly subordinate to the Director of Agriculture. When after some four or five years he had acquired considerable experience, he might be raised to a position such as that of Agricultural Inspector, in which he would be officially subordinate to the Director of Agriculture. A salary of Rs. 400 per mensem rising to Rs. 600 on reaching the higher grade, and then increasing in much the same way as in the Forest service, would, I think, meet the circumstances.

On account of the local knowledge he would possess, it is evident that such a man must of necessity be provincial. There would be a call for Native sub-assistants, and the whole would be subordinate to the Director of Agriculture.

In this way I believe the needed practical turn would be given to the appointment of Director of Agriculture, and by some such action alone can we, I think, expect to get a real understanding of the agriculture of the country, and suggest means and adopt intelligently measures for its improvement where possible.

The *President* said that Mr. Fuller agreed generally with Dr. Voelcker's note, and he invited discussion and proposal of a resolution.

Mr. Finucane said that he entirely agreed with Dr. Voelcker. He was anxious to record his opinion that the agricultural expert proposed as an Assistant for the Director should continue in agricultural work throughout his career. A man like Mr. Sen was in his opinion the *beau ideal* of such an Assistant, and with his qualifications as a Native would be better than an European. He would like to have five such assistants, one for each division, and could employ them usefully in making enquiries into the agricultural practices of districts or the supervision of experimental stations, and in teaching the people of the more backward districts the better agricultural practices which have been proved to be profitable in the more advanced districts. He instanced as a specimen of good work in this direction Mr. Sen's report on the

Agricultural Practices of the Dacca District and Mr. Basu's report on the Lohardugga District. It would be necessary, he said, that the footing of such men should be at least as good as that of a Deputy Collector.

Dr. Voelcker said that he had read Mr. Sen's report with great interest, and that he regretted the necessity which had arisen for transferring him from the Agricultural Department. Such men he thought should keep to agriculture throughout their life. It seemed to him that the Forest service offered a model for instituting a service for such men, and he suggested a training also in time and character similar to that of the Forest Department.

The *Hon'ble Mr. Benett* said that Mr. Lumsden had recommended a similar course, and that they had already an expert at Cawnpore.

Dr. Voelcker did not think that the training given at Cirencester would result in any good unless it was followed up by a practical training in India.

Mr. Steedman said that he understood Dr. Voelcker's note to imply that enquiry into agricultural practices is the essential of improvement, and that a technical assistant is necessary for this. Seeing that we have such Departments as those of Archæology and Horse-Breeding, and as proposed a Civil Veterinary Department, and in Bengal the Caste and Ethnological Survey, he was certainly of opinion that a trained agricultural expert for each Director was no less justifiable as well as highly desirable.

The *Hon'ble Mr. Benett* said that the North-Western Provinces Government intend that two of their civilians who are Cirencester graduates should be specially utilized for working out the analysis of districts.

Mr. Ozanne said that if the Assistant to the Director were always an agricultural expert, it would allow of the Director being selected from the Revenue Department, and he thought that the Director should be a Revenue man.

The *Hon'ble Mr. Nolan* agreed generally with Dr. Voelcker, and observed that the proposed arrangement would make it practicable hereafter to separate the functions of the Director of Agriculture from that of Director of Land Records or Settlements. He did not see why the expert should always be kept in the position of Assistant to a gentleman of inferior attainments in their special business. This was not the system pursued in regard to forestry or education, where the expert was placed at the head of the Department.

The *Hon'ble Mr. Benett* thought the Hon'ble Mr. Nolan's views would hold in Bengal, where there are no village papers. But in other provinces the village records contained many of the facts in which agricultural enquiry must be based. The supervision therefore of village papers and agricultural enquiry in such provinces must remain in the same hands.

Mr. Robertson thought that Directors were under an obligation to Dr. Voelcker for having kept so clearly distinct the duties of the expert and those of the Director. Even if the Director had the scientific training, he would not have the time, however fully trained, to undertake the duties of the expert.

Mr. Finucane said with reference to what fell from the Hon'ble Mr. Nolan that the Minister of Agriculture in France is not an expert in agriculture, nor the Naval Minister a great sailor. The Director of Agriculture need not necessarily be an agriculturist, and he did not, therefore, think there was anything inconsistent in Dr. Voelcker's proposals; nor was it, he thought, desirable to separate the functions of the Director of Land Records from those of Director of Agriculture.

Mr. Middleton said that the creation of a technical assistantship would be an inducement in aid of Superintendentships of Experimental Farms.

The *President* said that he understood that the sense of the meeting was generally in favour of Dr. Voelcker's proposals. They had now to consider what class of men should be employed. If natives are to be selected, it will be all the more necessary to have a high standard of agricultural education in this country, unless it is considered preferable that they should go to Cirencester or any other Agricultural College. In the case of the Forest Department education was being given in this country, and he would ask the Conference to state their opinion whether for the appointment in question the training should be given in this country or at Cirencester.

Mr. Finucane said that he was satisfied with the Cirencester men, but that they themselves considered that training should be given in this country.

Mr. Clogstoun said that the Madras Government proposed to educate their Superintendents of District Farms at Saidapet, and they might in time become good enough for the appointment of Assistants to the Director.

Mr. Steedman said he had no practical acquaintance of Cirencester men, but that he would prefer Englishmen.

The *President* pointed out that the question is whether, *if* natives are taken for the post, they should be educated here or in Cirencester ?

Mr. Steedman said that, having regard to the progress in *practical* agriculture made at home by the natives sent to Cirencester, he thought they had better be educated here.

The *Hon'ble Mr. Nolan* explained that the high position obtained by the Cirencester scholars in Bengal was in great measure due to the fact that they had received, before leaving this country, the highest education in science which the Calcutta University could give. He also considered that it would be best to obtain the future Assistant Directors in India, if fit men could be trained here. He would not create superior education merely for the purpose of training such Assistants, or regard the existence of Assistants as adding much weight to the arguments in favour of expenditure on higher agricultural education.

The *Hon'ble Mr. Benett* said that he was thoroughly in favour of training in this country.

Mr. Finucane said that one of the strongest objections to sending natives home to Cirencester is that they are discontented with their position here when they return.

Mr. Robertson said that we ought to have training in India.

Mr. Ozanne concurred, because he thought we would soon have the power of giving a good training in this country, and that local training in practical agriculture is of special importance.

Mr. Muir-Mackenzie said that as a Cirencester man he desired to place his concurrence on record.

Dr. Voelcker drew attention to the passage in his note (page 6) regarding the preferability of an Indian training. He had no desire to create a monopoly of such appointments for Englishmen, but it was worth remembering that Englishmen would be of use to control native subordinates. The expert would be associated with the Director, and he was of opinion that an European expert would be better than a native one. Where there were such men available as Mr. Sen, then he would advocate their employment, and he had no doubt when the necessary education was given in India, natives would be produced by it fit to be technical assistants.

The following resolutions were then put before the meeting by the President :—

First.—"That, in the opinion of this Conference, it is essential for the proper performance of the duties demanded from the Agricultural Department in the direction of agricultural improvement that the Director of the Department should be provided with an Assistant or Assistants who are experts in the practice and theory of agriculture."

Second.—"That it will be preferable to train natives to be qualified for the post of Assistant in the Agricultural Department in this country rather than in Europe, and that this end cannot be attained unless there be a high class education established in this country."

Mr. Thomson suggested an amendment, as they were not prepared in the Punjab to move in the directions discussed.

The *President* pointed out that since 1881 there had rested upon Local Governments in every province the duty and obligation of undertaking the improvement and investigation of agriculture. That duty and obligation had been imposed not by the Government of India, but by the Secretary of State, and had not been withdrawn. Of course it was left to each Local Government to determine whether the time had come to move in this direction in their Province.

Mr. Thomson understood that the time for taking action is not determined by the resolution, and withdrew his proposed amendment.

The *President* then put the resolutions to the vote, and they were passed.

Proceedings of the Agricultural Conference.

Seventh Meeting, Monday, the 13th October 1890.

PRESENT:

SIR E. C. BUCK, KT., *Secretary to the Government of India, Revenue and Agricultural Department.* — President.

HON'BLE W. C. BENETT, *Secretary to the Government of the North-Western Provinces and Oudh.*

H. F. CLOGSTOUN, Esq., *Commissioner of Settlements and Agriculture, Madras.*

DR. T. COOKE, *Principal, College of Science, Poona.*

M. FINUCANE, Esq., *Director of Land Records and Agriculture, Bengal.*

T. H. MIDDLETON, Esq., *Professor of Agriculture, Baroda College.*

HON'BLE P. NOLAN, Esq., *Secretary to the Government of Bengal.*

E. C. OZANNE, Esq., *Director of Land Records and Agriculture, Bombay.*

F. A. ROBERTSON, Esq., *Director of Land Records and Agriculture, Punjab.*

E. B. STEEDMAN, Esq., *Deputy Commissioner, Hoshiarpur, late Director of Land Records and Agriculture.*

R. G. THOMSON, Esq., *Officiating Revenue Secretary to the Government of the Punjab.*

DR. J. A. VOELCKER, *Consulting Chemist to the Royal Agricultural Society of England.*

J. W. P. MUIR-MACKENZIE, Esq., *Under-Secretary to the Government of India, Revenue and Agricultural Department.*

— Members.

AGRICULTURAL ENQUIRY.

The *President*: Before proceeding to the business of the day, invited any further discussion that might be desired of the resolutions passed at yesterday's meeting, and made himself the following remarks:—

The *President*: I ask leave to further draw renewed attention to the obligations resting on the Government of India, on Local Governments, and on Agricultural Departments in connection with agricultural improvement and education, and in so doing I desire to avoid any suggestion as to how those obligations should be fulfilled. I merely wish to draw renewed attention to their existence.

From some of the remarks which have been made during the proceedings of the Conference, it seems to have been assumed by some of the members present that it is *optional* whether any measures of material importance should or need be taken in connection with agricultural education or improvement. It has been inferred in some of the remarks that the subject is a minor and subordinate part of the administrative scheme, and that agricultural education and improvement are "luxuries," not necessities, of administration.

I venture to contend that it is not within the power of the Government of India, or of any Government in India, to assume this position, or to refuse to take material action, except on the score of impossibility. The plea of unimportance cannot be accepted. To repeat what has already been said in my opening remarks, Her Majesty's Government, in consequence of the repetition of famines culminating with the great famine of 1876-77, formally constituted a Commission to enquire into the agricultural conditions of India, and to

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Mr. J. B. Fuller was not present at this meeting.

recommend such reforms as they might consider necessary to place the administration of India in reference to the protection of the agricultural classes in a more secure position. I will quote one among many of the formal conclusions placed on record by the Commission in reference to the formation of Agricultural Departments. They wrote in Vol. II, Section II, of their Report as follows :—

"We now pass to the consideration of the measures which we recommend for the introduction of better methods of cultivation, and generally for the diffusion and application of a scientific knowledge of agriculture in India, and for the provision of a class of officers in the public service who shall possess such knowledge, and be in a position to apply it effectually. *On the importance of this knowledge* both to the governing class and the governed, it is unnecessary for us to dilate. Our report has clearly shown how greatly agriculture preponderates over all other interests and employments in which the people of India are engaged; *how essential we think it that technical knowledge should be called in* to enable the productive powers of the soil to be applied in the most effective manner, not merely to add to the wealth of the country, but to secure a food-supply which shall keep pace with the increase of population; and how valuable in all departments of administration would be the acquisition by the executive officials of more accurate knowledge of the statistics of agriculture, of the ordinary turn-out of the harvests, and the relative produce of the crops from year to year. As long ago as 1870 the Government of India began to take steps for establishing a more efficient system of control over the action of the Local Governments in relation to all matters connected with the statistics of agriculture and its practical improvement. *From time to time repeated injunctions have been issued that increased attention should be paid to these important interests*, but very little progress has been made in giving effect to these orders, and only in the North-Western Provinces have organized measures been taken in this direction by any of the Local Governments. It is our hope that the example thus offered may be followed at an early date elsewhere, and that an Agricultural Department may be established in every province on the general basis suggested in the former part of our report, and now further to be explained in detail."

Her Majesty's Government, in dealing with this and cognate recommendations of the Famine Commissioners, imposed on the Government of India the obligation of making proposals for giving to them practical effect. They wrote as follows :—

"These proposals aim at three objects :—

1st.—More complete and systematic ascertaining and rendering available of the statistics of vital agriculture and economic facts for every part of India in order that Government and its officers may always be in possession of an adequate knowledge of the actual condition of the country, its population, and its resources.

2ndly.—The general improvement of Indian agriculture with the view of increasing the food-supply and general resources of the people.

3rdly.—Better and prompter organization of famine relief whenever the actual approach of famine may be indicated by the statistical information.

"For the attainment of these objects, and especially of the *two former in ordinary times*, the Famine Commissioners have recommended the creation or extension of a very elaborate local machinery supervised and controlled provincially, and in the last resort, by a branch of your Secretariat.

"The proposals you now make with reference to these recommendations go somewhat beyond them as regards the ultimate supervision; they touch lightly on the provincial control; but they hardly deal at all with the point on which the Commission lay much stress—the local machinery. You say (paragraph 4) that local Agricultural Departments may hereafter be constituted at the different provincial head-quarters, and that you are prepared to entertain favourably any proposals from this view, from which I conclude that you do not purpose to take the initiative even to this extent in carrying out the suggestions of the Commission. The proposed district organization you dismiss on the grounds of its cost, and in one particular of its being open to objections of principle; and you make no reference to the suggestions for the provision of means for systematic agricultural research in India, nor to those for the promotion of agricultural knowledge in the Civil Service.

"5. I shall be glad to receive with as little delay as is consistent with the careful consideration *which their importance requires* a fuller expression of the views of your Government on these questions."

The final proposals of the Government of India were formally communicated to Her Majesty's Government in a despatch No. 19, dated 14th March 1881, and formally accepted by Her Majesty's Government in No. 55 (Revenue), dated 16th June 1881; they were then embodied in the Resolution

No. $\frac{6}{340-50}$-G., dated 8th December 1881, issued for the information and guidance of all Local Governments. Steps were taken in the years that followed to introduce into each province the administrative reforms necessary to give practical effect to these instructions. Delay has occurred in carrying them out in connection with agricultural improvement and education for four reasons—

The *first* that time was necessary to allow each Local Government to organize Agricultural Departments.

The *second* that it was primarily requisite to provide the Departments, when organized, with duties which would be of financial utility to the State.

The *third* that it was desirable to employ the Departments initially on arranging a system under which agricultural information and statistics could be continuously provided.

The *fourth* that the Supreme and Provincial Governments have since 1881 been embarrassed by financial difficulties.

The reasons which compelled delay have now been more or less eliminated. Ample time has been given for the organization of Departments. The Finance Commission have accepted the fact that they are financially useful to the State; systems, more or less complete, have been established in each province for the continuous supply of agricultural information and statistics, and financial embarrassment is understood no longer to exist. The obligation created by the Famine Commission of 1878-79, *i.e.*, obligation to give full effect to the recommendations of the Famine Commission, so far as they were accepted by Her Majesty's Government in connection with agricultural improvement and education, can no longer be avoided; and I submit that, in the face of the acceptance by Her Majesty's Government of the great importance attributed to that obligation, it is not constitutionally within the power of the Government of India or of any Local Government to relegate it to a subordinate position, or to consider the fulfilment of it as in any degree *optional*, unless they are relieved from the duty imposed upon them by Her Majesty's Secretary of State.

Mr. Thomson asked whether it was for the Conference to discuss the obligations resting on the Government of India or on Local Governments.

The *President*: It is certainly not for the Conference to suggest what obligations should be imposed on any Government, Imperial or Provincial. But it *is* the main function of the Conference to suggest and advise how obligations, which are in connection with agricultural improvement actually placed on record, can be practically fulfilled. Such obligations constitute the basis of its discussions, and it is imperative to ascertain and understand what they are, so far as they are recorded.

The *Hon'ble Mr. Nolan* observed that of the difficulties enumerated by Sir Edward Buck as having hitherto retarded the development of an active agricultural policy, that one alone which was connected with finance had been felt in Bengal. Want of money had been the obstacle there, not want of time. Sir Edward Buck might be able to speak with authority as to the removal of this impediment as it affected Imperial finance; but in the Lower Provinces it had not been even reduced, and while it remained it might prove insuperable. He enquired whether, in the opinion of the President, any advantage would ensue from preparing an estimate of the cost of carrying out the proposals of the Conference? If this were ascertained, some provision might be made to meet it.

The *President* said that if the Conference could sit for a considerably longer period, it might be possible to do so; but there was hardly time now. All that could be done now was to consider the principles involved. It would be for the Local Governments, when they had funds available, to decide how far the improvements suggested might be carried out. The President added that he would like to direct attention to the despatch sent by the Government of India in March 1881 to the Secretary of State, in which the former submitted certain proposals based on

the recommendations of the Famine Commission. The reply of the Secretary of State seemed to him to imply that the Government of India had underestimated the importance of the questions involved.

The Conference then proceeded to discuss the subject of the analysis of districts.

The *President* called upon the Hon'ble Mr. Benett to explain the system under which the pargana book is maintained in the North-Western Provinces and Oudh.

The *Hon'ble Mr. Benett* described the statistical registers maintained in the North-Western Provinces and Oudh. He said there was a series of registers for each village; and as each district comprised some two or three thousand villages, the registers were necessarily too numerous for any one to wade through them for information. What they had done was to have the information abstracted into pargana books,* each pargana employing between 40 or 50 patwaris. The pargana book contained about four pages of information for each village. The book is written up by the registrar kanungo, and on one page there are all the more important items relating to the village. The Collector or Deputy Collector during his tour sends for the pargana book, and writes in it anything of interest relating to the village. He thought that the book would gradually collect in a convenient form much valuable information, and in course of time would be of the greatest use. The North-Western Provinces and Oudh Government has recommended that every 8 or 10 years some official should analyse the pargana book and make an abstract. The pargana book should, he thought, be sent in to the Collector to sign.

Mr. Clogstoun said that they had a very elaborate system of statistics in Madras. They had elaborate returns from each district and taluk, which showed areas cultivated, held, irrigated, &c. The firka book, as it was called in Madras, would give information relating to the Revenue Inspector's area, and would, he thought, be of use in enabling the authorities to localize all cases in which the revenue was falling off. The village was the unit in Madras.

The *Hon'ble Mr. Benett* said that in the Central Provinces the registers were to be kept up much in the same way as in the North-Western Provinces and Oudh. But it had been considered preferable to have for each village a separate book, which could be sent for when required for inspection, instead of a register for the whole pargana.

The *President* pointed out that in some provinces the facts relating to each village are not brought together into one sheet. To gather the history of a village it would be necessary to go through a number of forms.

Mr. Robertson: I would ask leave briefly to describe the Punjab system of village records. Each village or "mouza" has a village note book containing ten statements, which give very full information as to its agricultural condition. The "patwari" of each circle keeps these up for the villages in his circle, and the "office kanungo" keeps up a counterpart of each one of these at the head-quarters of the tahsil, so that an officer can always consult these records either at the tahsil, or by sending for the tahsil copies, and while in camp he can consult the patwari's copy. Abstracts of these note books, one for each assessment circle, one for each tahsil, and, finally, one for each district, are also kept up. Every year the tahsildar has to record his remarks on the condition of the village on Statement X in these note books in one-fourth of the villages on his tahsil, and for seven months of the year either the tahsildar or his "naib" or assistant is bound to be in camp. In addition we have several other safeguards against the neglect of approaching famine or deteriorations. The patwari has to write up every month in his diary an account of the general condition of the crops, husbandry, and cattle of his circle. He is bound immediately to report any special calamities to the kanungo and the tahsildar. Field kanungos are directed to pay special attention to these matters when they visit a patwari circle. In addition to this, a statement of prices is furnished twice a month, and we receive besides a weekly telegraphic report on the state of crops and weather from thirteen selected

* *Vide* Appendix H.

districts, in which prices have to be noted. We also receive by post in the Director's office from every district a rain report every week, and a prospect report regarding the crops every month. The chain is therefore very complete. Patwaris constantly report on their circles to field kanungos, who in their turn report to tahsildars, tahsildars to Deputy Commissioners, and these last to the office of the Director of Land Records and Agriculture, who publishes in addition general summaries on the *kharif* and *rabi* harvests. It would not be easy under these circumstances for the deterioration of villages or the approach of scarcity to escape attention.

I have no wish to criticize the "pargana book," but I understand that where this pargana book is in existence, there are no separate village note books kept by the patwaris; and if we are to have one or the other, I think the note books preferable. Note books supplemented by the pargana book might be better still, but I doubt if the latter is absolutely necessary, and only urgent necessity would justify our imposing further tasks on our Revenue staff. The Punjab system may not be perfect, but I think it is a good one, and it goes a very long way to meet all the requirements of the Government of India on this subject.

The *President* said Mr. Robertson had shown that a great deal had been done in the Punjab, but what he (the President) wished to ask was whether the Punjab system fully met the requirements of the case.

The *Hon'ble Mr. Nolan* asked whether the proposal to keep village note books was intended to extend to provinces where there had been no cadastral survey?

The *President* thought that, where practicable, such books should be maintained, but it was not possible for the Conference to say in what provinces they should be kept up.

The *Hon'ble Mr. Nolan* found that the suggestion placed before the Conference by the Resolution of the Government of India, dated 25th March, extended in terms to all India, and therefore to those parts of Bengal where there were no village records, and no agency by which these could be compiled. Taken in this sense, it merged in the larger proposal of the Famine Commission Bill introduced for giving partial effect to the latter recommendation, and to be withdrawn in consequence of the reluctance of Her Majesty's Government at home to sanction even for a limited area the imposition of the rate advocated by the Famine Commission; and, in the face of this decision, it was hardly possible to advocate the extension of the system to the province generally.

The proposal also affected those parts of Bengal in which village accounts were kept up, particularly Government estates, and so far he thought it very reasonable. But he suggested that when a new register was introduced, some of those in existence might at the same time be abolished. It appeared that there were ten in use in the North-Western Provinces—that is, ten for each village; and he feared that we could not add an eleventh without discrediting a sytem which seemed already to have been pushed too far.

The *President* said he quite accepted the position that where there are no facts and statistics, they cannot be ledgered. We had only to deal with those provinces which can give us such statistics.

Mr. Steedman observed that the Punjab returns directly led up to what was prescribed by the Government of India.

Mr. Clogstoun pointed out that in Madras *zamindari* and *inam* villages there are accountants, and that the Local Government is considering the advisability of compelling them to keep records.

Mr. Finucane said the subject for discussion this morning he thought is the form and maintenance of district analyses. The objects arrived at in making these analyses of districts, as he understood it, are, first, the ascertainment of existing agricultural practices and resources of each district with a view, where possible, to the ultimate introduction of improvement; and, secondly, the determination with a view to the administration of famine relief of what

parts of each district or tract are protected from or liable to famine. The first of these objects may, he thought, be attained by such investigations as have been undertaken in Bengal by Mr. A. C. Sen and others. Mr. Sen's report on the Agriculture and Agricultural Systems of the Dacca District is a sample of an agricultural analyses of one district of this kind. Dr. Voelcker had told the Conference that he has perused the report, and that he has found it to be useful and interesting. Similar reports might in his (Mr. Finucane's) opinion be prepared with advantage for all districts in Lower Bengal, Behar, and Orissa. Officers engaged in the preparation of agricultural analyses of districts of the kind he referred to should, as a matter of course, take advantage of such statistics and information as are available in order to endeavour to determine what, if any, parts of each district and tract are liable to famine.

As regards the question of the form in which village registers should be utilized, it may remarked that in Bengal there were at present no village or pargana registers; and the question for consideration as regards Bengal was not so much the utilization of information provided in village registers as that of whether such registers should be prepared; and, if so, by what agency. This point was not, he understood, at present before the Conference. The question now before it was how certain registers kept up by village agency in some provinces should be utilized. As in Bengal they had no such registers, he need not make any remarks on this point. If the question were whether statistics where no such agency exist should be compiled by any other agency, and, if so, what agency, he would have something to say if that question were before the Conference.

The *President* then put the following resolutions before the Conference :—

1st.—"That where practicable agricultural statistics should be compiled by the village officers or agency for every village or estate in each province.

2nd.—"That where such are compiled, some system should be adopted under which the leading facts and statistics indicating the agricultural condition of the village or estate for each year should be abstracted in a simple form."

3rd.—"That these forms should be brought together in a special volume to be maintained for each administrative circle, *e.g.*, Revenue Inspector's circle, pargana, &c., in which district officers should from time to time enter remarks, if required, on the progress or degradation of the villages or circle.

4th.—"That some ystem should be established ensuring that the information contained in the forms shall be utilized by the district authorities.

5th.—"That it should be the special duty of the Agricultural Department to ascertain from time to time by inspection that the forms are properly maintained and efficiently utilized for each district."

The following discussions then ensued :—

The *Hon'ble Mr. Nolan* said with regard to the first resolution that the question whether where a new agency had to be created for the purpose it should consist of village officers was under consideration in Bengal.

Mr. Steedman said with regard to the second resolution that he understood the proposition was that all that information available should be abstracted. He thought that the kanungos were already too much occupied, and that this would seriously add to their work.

Mr. Robertson said the necessity for both the pargana book and village note book was not apparent.

The *President* mentioned that there had been instances brought to notice where the deterioration of villages had not been brought to light until too late owing to the absence of information easily accessible through such means as the pargana book.

The *Hon'ble Mr. Benett* confirmed this statement, and added that a well posted-up pargana book would be of great value to a new Collector. If he wanted any information regarding any village, he could get it in little time by referring to the pargana book. The village papers would be too voluminous for him to look into.

Mr. Clogstoun said that in Madras a book of the kind would be most useful for the Revenue Inspector.

The *President* said that another argument not yet mentioned in favour of the pargana book was that such an abstract would be useful for periodical comparison with the Settlement Officer's report.

The *Hon'ble Mr. Benett* observed that much of the cost and labour required for the completion of recent settlements in the North-Western Provinces might have been avoided if pargana books had been maintained for the districts from the first.

Mr. Steedman did not think the resolution called for. In the Punjab the work would be increased, whereas at the present time an endeavour was being made to reduce the statistical tables now prepared.

The *President* said that returning to the main subject of discussion—district analysis—he did not think that, if the resolutions were adopted, a very searching analysis would be gradually worked out. Special reports on agricultural practices, though they would be useful if the Local Government possesses the necessary machinery to furnish them, do not constitute the analysis required by the Government of India Resolution of December 1881. If the gradual history of a village were recorded year by year, we should have in time the most perfect analysis of a district. All that he advocated was that some measures should be taken for providing for the growth of a district analysis. If the Conference accepted this view, it would not be necessary to enter into any lengthy discussions regarding the importance and value of district analyses which had already been admitted. The pargana book was started in the North-Western Provinces in 1883 after he had left the province. But the special advantage he claimed for the pargana book was that it provided a compendious view of the general condition of the tract to which it related. When he visited the province in 1889 and inspected one of these books, he had six years' statistics to go on, and he could have written from the book an account of the tract to which they referred in one afternoon.

The *Hon'ble Mr. Benett* said that there was the danger that the attention of the Collector will be devoted entirely to those villages selected for analysis. In the North-Western Provinces it was almost impossible to say whether one village was worse than another. It was absolutely essential after an analysis had been completed that it should be gone on with. A stereotyped form of analysis was not desirable.

Mr. Clogstoun thought that the term "district analysis" was not an appropriate one.

The *President* agreed that a better term might have been selected, and that it was always possible to revise it. The President's resolutions were finally agreed to by the Conference. Referring to the Bombay Statistical Atlas, the President enquired whether the Conference would recommend a similar publication for other provinces.

Mr. Thomson feared that a Statistical Atlas such as that of Bombay would be an expensive work to get out frequently.

After further discussion on the subject, the following resolution was also passed :—

"That the district analysis contemplated by the Government of India Resolution of 1881 will be effectually provided for by the settlement reports and records, supplemented by the annual abstracts of village statistics. But that it will be also useful that the Agricultural Department should collate and publish, or encourage the collation and publication from time to time of, general information and statistics showing the agricultural condition of each district either in short abstracts or in such volumes as the Statistical Atlas of Bombay, or, where statistics are not available, such reports as those of Mr. Sen's and Mr. Basu's on the Dacca and Lohardugga Districts in Bengal.

The Conference closed with a vote of thanks to the President proposed by Mr. Clogstoun, and seconded by the Hon'ble Mr. Nolan.

[G. C. F.]

G. C. Press, Simla.—No. 727 R. & A. D.—8-1-91.—700.

APPENDIX A (*vide page 1 of Proceedings*).

No. 345—55 R.

Extract from the Proceedings of the Government of India, Revenue and Agricultural Department, No. 345—55 R., dated 25th March 1890.

REVENUE.

Read Finance Commissioner's Note F. C.—30, and the following correspondence, regarding the duties and cost of Agricultural Departments :—

Letter to the Government of Madras, No. 263—66-1 R., dated 3rd June 1887.
Letter from the Government of Madras, No. 63, dated 19th January 1888.
Letter to the Government of Madras, No. 699—32-2 R., dated 26th September 1888.
Letter from the Government of Madras, No. 79 A., dated 14th November 1888.
Letter to the Government of Bombay, No. 258—67-1 R., dated 1st June 1887.
Letter from the Government of Bombay, No. 7167, dated 27th October 1888.
Letter to the Government of Bombay, No. 91—28-2 R., dated 4th February 1889.
Letter from the Government of Bombay, No. 4101, dated 6th June 1889.
Letter to the Government of Bombay, No. 550 R., dated 3rd August 1889.
Letter from the Government of Bombay, No. 8914, dated 25th November 1889.
Letter to the Government of Bombay, No. 189 C., dated 30th January 1890.
Letter from the Government of Bengal, No. 2419—913 L. R., dated 1st December 1886.
Letter from the Government of Bengal, No. 2420—389 (Agri.), dated 1st December 1886.
Despatch to the Secretary of State, No. 3 (Revenue), dated 10th May 1887
Letter to the Government of Bengal, No. 209—68-2 R., dated 6th May 1887.
Letter to the Government of Bengal, No. 219—68-3, dated 11th May 1887.
Despatch from the Secretary of State, No. 61 (Revenue), dated 18th August 1887.
Letter to the Government of Bengal, No. 523, dated 27th September 1887.
Despatch to the Secretary of State, No. 9 (Revenue), dated 18th October 1887.
Letter to the Government of the North-Western Provinces and Oudh, No. 210—69-1 R., dated 7th May 1887.
Letter from the Government of the North-Western Provinces and Oudh, No. 1410—I.-243 A., dated 3rd November 1887.
Letter to the Government of the Punjab, No. 315—93-1 R., dated 24th June 1887.
Letter from the Government of the Punjab, No. 140, dated 2nd December 1887.
Letter to the Chief Commissioner, Central Provinces, No. 192—63-1 R., dated 27th April 1887.
Letter from the Chief Commissioner, Central Provinces, No. 491 S., dated 14th May 1887.
Letter to the Chief Commissioner, Burma, No. 190—64-1 R., dated 26th April 1887.
Letter from the Chief Commissioner, Burma, No. 450—72 R., dated 16th March 1888.
Letter to the Chief Commissioner, Burma, No. 321—71-4 R., dated 4th May 1888.
Letter from the Chief Commissioner, Burma, No. 474—118 R., dated 18th May 1888.
Letter to the Chief Commissioner, Assam, No. 191—65-1 R., dated 26th April 1887.
Letter to the Chief Commissioner, Assam, No. 289—65-2 R., dated 9th June 1887.
Letter from the Chief Commissioner, Assam, No. 2359, dated 13th July 1887.
Chief Commissioner's Circular (Assam), No. 31, dated 28th June 1887.
Letter to the Chief Commissioner, Assam, No. 441—65-4 R., dated 18th August 1887.
Letter from the Chief Commissioner, Assam, No. 3532, dated 26th October 1887.
Letter to the Chief Commissioner, Assam, No. 45—9-1 R., dated 9th January 1888.
Letter to the Chief Commissioner, Assam, No. 148—9-3 R., dated 18th February 1888.
Letter from the Chief Commissioner, Assam, No. 466, dated 3rd February 1888.
Letter from the Chief Commissioner, Assam, No. 1571, dated 2nd June 1888.
Despatch to the Secretary of State, No. 3 (Revenue), dated 5th February 1889.
Despatch from the Secretary of State, No. 33 (Revenue), dated 21st March 1889.

Read again the following correspondence on the subject of rules for regulating the pay of Directors of Land Records and Agriculture :—

Letter from the Chief Commissioner, Burma, No. 202—4 G., dated 9th April 1889.
Letter to the Chief Commissioner, Burma, No 615—51-4 R., dated 22nd August 1889.
Despatch to the Secretary of State, No. 295 (Salaries and Establishments—Land Revenue), dated 17th September 1889.
Circular to Local Governments and Administrations (excepting the Government of Madras), No. 69—51-6 R., dated 12th October 1889.
Letter to the Government of Madras, No. 67 C. I., dated 27th December 1889.
Despatch from the Secretary of State, No. 105 (Revenue), dated 7th November 1889.
Circular to Local Governments and Administrations (excepting the Government of Madras), No. 165—170 C.I., dated 23rd January 1890.

Read also—

Resolution of the Government of India, No. 44 F., dated 9th June 1883, issuing instructions regarding the adoption of a Code for Famine Relief.
Resolution of the Government of India, No. 63—77 C. (Famine), dated 19th December 1889, regarding the examination and revision of the Provincial Famine Codes.

A

Read again—

Despatch to the Secretary of State, No. 197 (Financial), dated 21st July 1888.
Despatch from the Secretary of State, No. 104 (Revenue), dated 13th December 1888.
Despatch to the Secretary of State, No. 6 (Agriculture), dated 1st June 1889.
Despatch from the Secretary of State, No. 108 (Revenue), dated 7th November 1889.
Letter to the Government of Madras, No. 133 C., dated 8th January 1890.
Letter to the Government of Bengal, No. 214 C., dated 1st February 1890.
Letter to the Government of the North-Western Provinces and Oudh, No. 215 C., dated 1st February 1890.
Letter to the Chief Commissioner of the Central Provinces, No. 219 C., dated 1st February 1890.
Correspondence regarding the appointment of an Agricultural Chemist and the deputation of Dr. Voelcker to India.

RESOLUTION.—The Governor General in Council, in communicating for general information the correspondence connected with the Finance Commission's enquiries regarding expenditure on Departments of Land Records and Agriculture, desires to take the opportunity to review briefly the present position of the Departments and to draw renewed attention to the duties for which they are specially responsible.

2. In 1881 Her Majesty's Secretary of State, in pursuance of the recommendations of the Commission appointed to investigate the causes which lead to, and the measures necessary for, the prevention of famines in India, authorised the constitution in each Province of a special Department, the duties of which were to be classed under the three heads—

(1) Agricultural enquiry.
(2) Agricultural improvement.
(3) Famine relief.

3. The responsibilities and functions of the Departments involved under the third head are dealt with in the Famine Code which has been issued in each Province, and they will be determined in more precise detail when the revision of the Codes, recently ordered, has been completed. It is not expedient to enter into any particular examination of them in this Resolution. It is sufficient for present purposes to note that the Departments of Land Records and Agriculture are concerned rather with the collection and collation of statistics and facts calculated to be useful to those who have to administer famine relief than with the direct organisation of famine relief itself; and that any work which they may be called upon to do under the name of famine relief must be the direct or indirect outcome of that general agricultural enquiry which forms the most important part of the Famine Commissioners' recommendations. It is only necessary, therefore, to consider at present what has been or remains to be done under the first two of the heads under which the duties of the Departments were originally classed.

3. The Resolution No. 6—340-50 G., of the 8th December 1881, on the formation and duties of the new departments, indicated that throughout the greater part of British India the primary basis of agricultural enquiry must be the facts and statistics recorded, in respect to each field and each village, in the forms of accounts or other returns and records which are annually prepared by the village accountants.

In accordance with this view the first object which the Departments were required to secure was the gradual improvement of these village officials in order to secure greater accuracy in the returns provided by them. The orders which have from time to time been issued by the Government of India and Provincial Governments in connection with this aim have indicated that, so far from the responsibility of the district officials for the efficiency of the village accountants and the accuracy of their returns being interfered with or weakened by the performance of the duty thus imposed on the Departments, the fulfilment of their responsibility has been facilitated and strengthened. In almost every Province the primary measure taken has been the better organization and inspection of the staff by whom the village accountants were themselves immediately supervised. In other words, the new Departments have been made specially responsible that the supervising staff in each district is in all parts of a Province uniformly efficient, and that, under the control of the district officials, it is continuously and adequately maintaining the land records and accounts of each district up to the requisite standard. The initial aim, in fact, of the inspection system which has been introduced is that the reports of the officers of the special Department should provide information to the district officials themselves, as well as to the chief revenue authorities, in what respect or to what extent in each district the village establishments and their supervising staff may have failed to satisfy the requisite conditions. The defects having been discovered and pointed out, the responsible authorities have been able to correct them. A uniform and satisfactory standard is thus being gradually reached, which hitherto the individual and unequal efforts of district

officials had, with rare exceptions, failed in attaining, and, in the opinion of His Excellency the Governor General in Council, the chief factor in the reform has been the periodical inspection of the supervising staff in each district by an official, whose technical experience and whose knowledge of defects likely to occur and where to look for them, have brought to light various errors and irregularities which had been allowed to grow up; who has been able to gauge the general efficiency of the staff of village accountants; and who has been specially competent to discover in what respects the supervising officials have proved themselves to be inefficient or careless, to have been insufficiently acquainted with their duties, or to have misunderstood the forms of accounts and land records.

4. Turning now to the ultimate object with which the Agricultural Departments have been thus required to secure the systematic improvement of village accountants and their returns, this is, as already indicated, the establishment of a foundation of statistics and data upon which may be based a system of continuous "agricultural inquiry," the wide significance of which term is fully explained in the Resolution of 1881. But in almost every Province subsidiary results have also been gained in the process. The work of revenue administration has been facilitated; the rights and interests connected with land have been more correctly recorded; the business of the Civil Courts has been simplified; frauds or deficiencies in the collection of rent and revenue due to Government have been prevented; and the future revision of land assessments has been made less costly. In several Provinces the village accountants, who a few years ago were on the whole an uneducated and inefficient body of men, have been trained to conduct under the guidance of the supervising staff the annual field plotting and revision of the village maps which changing circumstances render necessary, and without which the constant employment of special survey establishments would be called for, while in one Province—in which ten years ago these village officials were in many districts exceptionally illiterate and backward—almost the whole of the revision of the survey of from 30,000 to 40,000 square miles has been effected with remarkable accuracy by the agency of village establishments. The Government of India, though viewing with satisfaction the general progress already manifested, does not wish to imply that perfection has been attained in any Province. The ideal which should be kept in view is that every village should possess an accountant trained in surveying and crop inspection, compiling and submitting his returns intelligently and punctually. The difficulties of procuring such an official vary in the different Provinces, but are especially great in those where the hereditary system is in full development, or where the functions of the village accountant are largely concerned with the actual collection of revenue. It is the duty of the Departments to devise methods of overcoming these difficulties, and to remedy defects, as far as possible, both by constant inspection, and by assisting the Government and the district officials with suggestions and advice regarding the improvements which may be possible either in the education and qualifications of the accountants, in their methods and standards of work and discipline, or in the form, matter and compilation of their records.

5. In 1887 a Finance Commission was appointed under the direction of Her Majesty's Secretary of State to review the expenditure entailed by the administration of the country. In dealing with the cost of the Agricultural Departments which were the outcome of the Famine Commissioners' recommendations, the new Commission desired that the value of the Departments should be tested by an inquiry into the financial, apart from the purely administrative, effect of their working; in other words, by ascertaining whether the improvement and more systematic utilization of the village accountants and their returns, so far as this was due to the Departments, had proved remunerative or the reverse. This recommendation of the Finance Commission was supported by Her Majesty's Secretary of State. The test which the Commission suggested for application was an estimate of the saving which would be effected by the diminution of periodical expenditure on surveys and settlements in consequence of the improved village records. In dealing, however, with certain ryotwari Provinces, in which the land assessment of each district is subject to annual fluctuations, it was found necessary so to extend the estimate as to allow it to include the saving which might result from the prevention of frauds and deficiencies in the annual collections. Except in the case of the Madras Presidency, in which the circumstances are in some respects exceptional, the enquiries thus instituted have been recently completed, and the correspondence on the subject is now circulated for general information.

This correspondence indicates that at the commencement of the present year the Government of India was in a position to report to Her Majesty's Secretary of State that every Local Government, other than Madras and Bombay, had been able to show that a considerable economy had been effected. More recently also it was found possible to submit, from the Bombay Presidency, final proposals which, although not equally favourable when gauged by a purely financial test, offer considerable advantages in an administrative direction. The

amount gained in three Provinces alone during the current decade is said to have been 200 lakhs of rupees, and the additional gain in six Provinces during thirty years is estimated to be from 12 to 16 lakhs a year after charging the cost of the Departments and after material reductions on the original estimate.

6. A stage has now been reached in the history of the Departments at which His Excellency in Council considers that more definite consideration should be given to the fulfilment of those other important duties which have been imposed upon them in pursuance of the recommendations of the Famine Commissioners. Hitherto little has been done beyond the systematic organization of the arrangements under which the improvement of the staff of village accountants and their supervision have been effected or are to be maintained. But for the necessity in the first place of allowing time for the development of this organization, and in the second of meeting the view taken by the Finance Commission that the position of the Departments should be first justified by direct financial results, an earlier opportunity would have been taken to call attention to the further responsibilities which rest upon the Departments, and which have been so far inadequately or unequally fulfilled. These may be briefly indicated as, firstly, the utilization of the statistics and data deduced from the village accounts and returns for the purposes required by the Famine Commissioners; and, secondly, "agricultural improvement" in the wide sense attached to that term in the despatch received from Her Majesty's Secretary of State in 1881.

7. Both subjects were to some extent dealt with in the Resolution issued in 1881. In regard to the first it was indicated that, when the machinery through which information was to be primarily collected had been brought into working order, an analysis of agricultural tracts should be undertaken with the view of determining the measures necessary to protect them against famine and to secure in them the maximum efficiency of agricultural operations.

As pointed out in the recent Resolution of the 19th December last on the revision of Famine Codes, it was intended that the examination and analysis of agricultural tracts should be based primarily upon the returns provided by village accountants, and it is now necessary to determine with more precision how this object can be satisfactorily attained. The history of recent years has confirmed the opinion expressed by the Government of India in the Resolution of 1881 and in subsequent Resolutions, that the distress of the agricultural community consequent upon the failure of crops, the undue pressure of land assessments, or other causes, can be materially alleviated by timely measures of relief which would be suggested by a more intimate acquaintance with the annual condition of precarious tracts than has hitherto existed. Many cases, for instance, have occurred, and not a few of them at very recent dates, in which, owing to the absence of continuous and systematized information, deterioration of agricultural conditions has not been followed, until too late, by the suspension and remission of land-revenue, or by the requisite reduction of assessment for which the circumstances have called; or again, in which the approach of famine has not been met, as it should have been, by adequate and timely measures of relief. It is the duty of the Departments of Land Records and Agriculture to organize and maintain a system which, if efficiently worked by the executive and responsible officials, shall make such events impossible. In the opinion of the Governor General in Council, adequate experience has now been gained in various Provinces to admit of the consideration of the broad principles upon which the statistics and data annually provided by the village establishments can be most effectively utilized for the purposes indicated in the Resolution of 1881, and to demonstrate the necessity that the special attention of every Local Government and Administration should be given to the subject.

The system adopted in each Province must vary in accordance with local conditions, and it is, perhaps, premature to determine, at this stage, the principles which would be found useful for general application. But the Government of India has no hesitation in suggesting that one practice, already adopted in some Provinces, may with advantage be generally accepted, namely, the institution for every village of a separate record, wherein should be ledgered each year those facts and statistics which prominently indicate the fluctuations of its agricultural condition and afford clear evidence either, on one hand, of its increased prosperity, or, on the other, of its deterioration. Further suggestions on this subject will be circulated at a later date.

8. In the Resolution of 1881 the remaining duty of the Departments, *viz.* that of directing the development of agricultural improvement, was made secondary to that of acquiring a knowledge of the agricultural conditions of the country. Sufficient progress, however, has now been made in the organization of a system of agricultural enquiry to admit of a more precise determination of an examination of the subordinate question on which the action of the Departments should be based. In the opinion of His Excellency in Council three principles may at once be laid down for adoption. The first is that continuous enquiry should be maintained by means of experimental farms or other similar agency, with the view of ascer-

taining the possible results which may be gained by the introduction of new, or the modification of existing, processes and practices connected with agriculture. The second, that the education of the agricultural population, and especially of the lower classes, should be so directed as to enable them to appreciate and, where expedient, to adopt those results. The third, that protection should be given to precarious tracts by measures which lie within the power and means of the State, but beyond those of the people.

The action involved by the application of each of these principles requires a considerable period of time for its full development, and must, in the opinion of the Government of India, precede any systematic or costly attempt to introduce supposed or suggested agricultural improvements. And in each case a carefully considered programme or working-plan is required before action can be properly commenced. As indicated by the Secretary of State in his Despatch No. 33 of the 21st March 1889, while it will be necessary for each Local Government and Administration to carry into practical effect the policy regarding agricultural education and other administrative matters with which the Departments are concerned, it is the duty of the Imperial Government to control and direct the general policy. But, before laying down the broad principles upon which action should be based, the Government of India is anxious to place itself in the closest possible acquaintance and accord with the opinions and desires of the Local Governments.

9. His Excellency in Council considers that a convenient opportunity will occur for discussion of the general questions dealt with in the two preceding paragraphs in connection, firstly with the anticipated report of Dr. Voelcker, the Agricultural Chemist to the Royal Agricultural Society of England, whom the Secretary of State has recently deputed to India for the investigation and examination of the conditions under which action may be usefully taken in connection with agricultural experiments; and, secondly, with the report, now under the consideration of the Madras Government, of the Committee appointed by His Excellency the Governor of Madras to investigate the results of the action taken for some years past in that Presidency in the direction of agricultural improvement. The correspondence which has been circulated in reference to the appointment of an Agricultural Chemist indicates that the original proposal of the Government of India contemplated the utilization of the services of the Chemist both in respect to the institution of systematic enquiry on experimental farms and otherwise, and also in respect to the education imparted in Colleges of Agriculture and Forests, both of which subjects are cognate to the questions of which the Government of India desires the discussion. The report of the Madras Committee, on the other hand, will provide useful information as to the results of the action which has been taken in that Presidency, and the directions which experience has there proved it to be desirable to follow or avoid. His Excellency in Council accordingly desires that a Conference should be held at Simla on the 1st of October next, by which date the report both of the Agricultural Chemist and the Madras Commission will have been received, and that before the 1st of August each Local Government and Administration should nominate the officer or officers whom it may wish to attend, including, unless there is some special objection, the Director of the Department of Land Records and Agriculture.

10. His Excellency the Governor General in Council desires also that advantage should be taken of the Conference to discuss the measures which may have, previously to the date of its assembling, been suggested by Local Governments and Administrations in connection with the 7th paragraph of this Resolution for the effective utilization of village accounts and returns for the purposes required by the Famine Commissioners.

11. In the meanwhile, such further information and correspondence as may be available will be circulated by the Government of India.

To the Government of Madras.
" " Bombay.
" " Bengal.
" " North-Western Provinces and Oudh.
" " Punjab.
" Chief Commissioner of the Central Provinces.
" " " Burma.
" " " Assam.

To the Secretary for Berar to Resident at Hyderabad.
" Chief Commissioner of Coorg.
" " " Ajmere.

ORDER.—Ordered, that the above Resolution be forwarded to the Local Governments and Administrations noted on the margin for information and guidance.

Ordered, also, that the above Resolution be forwarded to the Administrations noted on the margin for information.

APPENDIX B (*vide page 8 of Proceedings*).

Dated Poona, the 8th July 1890.

Report of Committee appointed by Bombay Govt. Resolution No. 3664, dated 27th May 1890.

WE have the honour to intimate that we have discussed in Committee the subjects to which our attention is directed in Government Resolution No. 3664, dated 27th May 1890, and to submit our report as follows :—

2. We would observe, *in limine*, that we consider that the ordinary administrative machinery of this Presidency, which is being strengthened by an increased and better paid inspecting subordinate establishment, will efficiently furnish all the safeguards against surprise by famine which it is the object of Rule 2 of the Provisional Famine Code to provide. Our village system, coupled with the intimate knowledge of, and close touch with, their respective charges, that our District Officers are compelled, by constant and almost continuous touring, to acquire and keep up, ensures the premonitory symptoms of a scarcity or failure of crops being brought to notice without any special staff of observation beyond that which is now being organized. Another preliminary remark, which our experience induces us to make, is that, in the districts where the chances of famine are greatest, the conditions of agriculture are such that famine cannot be said to approach with slow and gradual steps to be watched and reported on. If the rains fail, or fail partially in the early part of the monsoon, and the autumn (*kharif*) crops fail with them, the people wait for the later rains to cultivate the spring (*rabi*) crops. The rains may again hold off in a manner to cause alarm, but not until the end of September, and sometimes even later, need hope be abandoned. A few days' good rain may ensure a moderate, a few more days' perhaps a bumper, crop.

3. It is again within our experience that, in cases of scarcity or failure of crops over a limited area, the migratory and independent habits of the people make any action for their relief superfluous. Some of us have seen relief works opened and only taken advantage of by the ordinary able-bodied labourers of the neighbouring villages, while half the houses (or, in some instances, the larger majority of them) in the vicinity are locked up and deserted, the owners having gone in search of employment during the months that intervene before the renewal of their own agricultural operations.

4. But we fully recognise that it is *because* local scarcity is attended with little actual danger to the inhabitants of the affected area, while if the failure extends over several districts Government action becomes called for, that the collation of information by the Agricultural Department is exceedingly desirable, as it will put Government in a position to know whether a widespread calamity has to be met and dealt with, and at the same time save any chance of its being affected by the naturally exaggerated apprehensions of local officers when scarcity is confined to any particular district or portion of it.

5. But while thus allotting to the Director of the Agricultural Department and his Divisional Staff the task of collating and supplying information so as to place before Government a synoptical view of the condition of the whole Presidency, and while further making it incumbent on the Director to check the collection and annual compilation of statistics to be submitted to the Collector and to bring to his notice irregularities and shortcomings, we urge that District Officers must on no account be relieved of the responsibility which now falls on them. It should be their duty, as heretofore, to keep themselves at all times acquainted with the condition of the people, the prospects of the harvest of their district, and to ascertain and report any unusual mortality among cattle from scarcity of fodder or from disease. The initiative in proposing or preparing measures of relief should be theirs, while, subject to the instructions of Government and with due regard to the advice of the Head of the Agricultural Department, the Circle Inspectors should, as now, be subject to their orders and control.

6. A Committee, of which most of us are members, is submitting proposals for the proper organization of the inspecting staff. It will only be necessary, in order to carry out the wishes of the Government of India, to incorporate in the Provincial Famine Code the special rules for the guidance of the Circle Inspectors. The rules which we think should be incorporated are shown in the Appendix. Very little further modification of the Code is necessary.

7. As regards the other points to which our attention has been directed, no fresh rules seem called for. The statistical account required by Section 17 of the Code has already been prepared, and provision is being made for the "minute, but compendious, analysis of precarious tracts."

8. A full return of famine works, which it would be expedient to entertain in case of emergency, has been prepared and submitted for each district. We would recommend that revised returns be prepared and periodically renewed as may be called for. Of the works originally entered, many may have been subsequently carried out, and the available programme

should always be kept up to date. But no new provision in the Code is needed; for the orders of Section 29, that the programme should be "maintained," cover the necessary periodical revision. Our experience has taught us that it is only in exceptional districts that minor works under Civil Agency can be undertaken in any large number. The District Boards might be instructed to prepare and keep a list of these; but, except in the case of earth-works of the simplest nature, such as tank clearances or repairs to dams, there are no works on which unskilled labour can be profitably employed on any scale without professional supervision.

9. As regards the utilising forest-produce for human food, we need only refer to the Government Resolutions on forest settlements conceding special privileges to wild tribes and certain other classes of the inhabitants of forest tracts as to the collection of edible wild fruits and roots. In times of great scarcity or famine it should be open to the Collectors to extend such privileges to all classes. In the latest Panch Mahals Settlement Reports special provision has been made to meet the exigencies of scarcity and famine (Government Resolution No. 2368, dated 20th April 1887).

10. The question of price returns, referred to in the 9th paragraph of the Government of India's Resolution, has been considered and met by special provision in our additional rules for the special attention of, and report by, the Collector (Appendix, Rule *g*).

We would submit, for the consideration of Government, that the fortnightly and monthly price returns published in the *Government Gazette* might with advantage be submitted from the districts to the Director, Land Records and Agriculture, and compiled by him. He would be able to add explanatory remarks as to variations, and steps might be gradually taken to ensure a higher standard of accuracy. It cannot be expected that the necessary scrutiny of returns should be made in the Secretariat, and there is no want of evidence to show that such scrutiny is very much needed.

11. We can give no opinion based on *recent experience* as to the relative advantages of a money dole, a grain dole, and the distribution of cooked food, because fortunately we have had no widespread famine since the date of the preparation of the Bombay Famine Code and that Code embodies the experience of the great famine of 1876-77.

12. Turning now to the Government of India Resolution No. 345-55-C. I., dated 25th March 1890—

We have already discussed head (3) Famine Relief. As to head (1) Agricultural Enquiry, adequate measures have been or are about to be taken for the due record of facts and statistics. The Manual of Revenue Accounts has been carefully revised and is complete, and the staff engagad in supervising the collection of village statistics and compiling taluka returns is to be re-organized,—a question dealt with in the report called for in Government Resolution No. 1616, dated 27th February 1890, and we need only remark, in this place, that the prominence which the Supreme Government gives to the re-organization, from a famine point of view, adds weight to our recommendation, that no time should be lost in reforming the present Bhag Karkun establishment.

13. The subsidiary question of the education of kulkarnis and talatis has been fully dealt with in the report of the Committee of 1888, dated June 30th, paragraph 6, and we completely approve of the decision arrived at by that Committee, the gist of which is that while in Gujarat, where the talatis are stipendiary, the ideal, that "*every village* should possess an accountant trained in surveying and crop inspection," may be pursued by the Agricultural working with the Revenue Department, it can never be realised in those parts of the Presidency where the village officers are hereditary. In such parts the aim should rather be that *each circle of villages* should be in charge of an Inspector fully competent to survey and to guide the crop inspection of the kulkarnis.

14. The second head, (2) Agricultural Improvement, is sub-divided into—

(A) Analysis of agricultural tracts specially liable to famine, and

(B) Schemes for agricultural improvement, including agricultural education.

The duty of preparing a more detailed district account than that contained in Mr. Ozanne's Statistical Atlas will devolve on him and his Assistants. The appointment of Divisional Inspectors, to act in the latter capacity, is proposed in the report above alluded to.

The Government of India desires that a separate village record should be maintained, in which facts should be ledgered which indicate the fluctuations of the agricultural condition of every village and any improvement or deterioration. Such registers will, in our opinion, be necessary for the purposes of future revisions of rates. Forms should be fixed by the Director, and these should be filled in annually by the Circle Inspectors when assembled at the taluka or the compilation of the taluka returns. The principle has already been established that "the skilled supervision which directs the collection of these facts will also digest them for general use" (Government Resolution No. 2557, dated 24th March 1884, paragraph 9).

The Mamledars will be responsible for the correct compilation of the taluka returns, while the District Inspector will make it his special care to watch and check the ledgering of the statistics, year by year, required both for famine needs and for revisions of rates.

It seems well here to explain what the registers will show.

There will be at least three registers:—

1. Ledger of population and resources (compiled from Village Form 13).
2. Ledger of wells (compiled from Village Form 15).
3. Ledger of cultivation (Village Forms 16 and 16A, Irrigation).

Such statistics are now, as far as possible, shown in the survey revision reports, being collected at the time of the revision survey. In future they will be collected year by year and village by village. This will entail no provision for establishment beyond that now being made.

There are other important statistics shown in the survey settlement reports village by village. These are the records of sales and leases of land registered in the registration offices. Their practical value can be largely increased for settlement purposes if they are properly formulated and explained. They afford means of gauging the tendency of land to pass into the possession of money-lenders and those large capitalists who invest in land in some districts. We think that the Divisional Inspector should visit the registration offices and examine these records, collating and digesting them with the aid of the District and Circle Inspectors, who have it in their power to ascertain the circumstances under which the recorded transactions took place.

It is not out of place to remark that taluka ledgers, containing the information which we propose should be tabulated in the village ledgers above referred to, are now regularly maintained in the office of the Director.

15. As to agricultural education and improvement, we will discuss the former subject first.

It is within the cognizance of Government that the College of Science, Poona, has been enlarged so as to constitute the agricultural branch of that college the agricultural college of the Presidency, and that a similar step is being taken in connection with the Baroda College. Both colleges are now affiliated to the University for the Diploma in Agriculture recently instituted by the Senate. Farms are or are about to be attached, which will be to some extent experimental, but primarily demonstration, farms, on which the students in argriculture can see the staple crops of the locality grown, and can watch experiments. These farms will be respectively under the Superintendent of Farms, at Poona, and under the Professor of Agriculture at Baroda, each assisted by qualified Assistants. One of the duties of these Assistants will be to hold farm classes on the farms. At Poona theoretical instruction is imparted by a teacher of Agriculture and Botany, as well as by the Professors of Chemistry, Physics, and other kindred subjects. A veterinary hospital is attached to the college, to make the lectures in veterinary science more practical.

Thus provision is made, both for the theory and practice of agriculture.

The students are, for the most part, Brahmans and Parsis, but many, especially from Gujarat, belong to the purely cultivating classes. They are not always or generally youths who intend to farm themselves, but are candidates for the Diploma, seeking thereby an entrance into Government service. It is our conviction that the beginnings in agricultural education should thus be made among the educated classes. The successful candidates for the Diploma will seek employment in the Revenue Department, after the small demand for the Agricultural and Educational Departments has been satisfied. The posts in the last named department are those of high school teachers of agriculture and physics, who are, at present, men trained at Madras or Poona. They teach the first principles of agriculture common to all systems, and they give some practical instruction on the plots of land specially attached to the schools for this purpose. It is intended that the agricultural classes in the high schools should feed the agricultural colleges and in some degree this result is being secured.

We must instruct the educated classes first, so that they may assist in agricultural enquiry. When that enquiry has sufficiently advanced—and it must advance slowly when we consider the great variations due to soil, climate, and situation—it will, in our opinion, be time to take steps to teach the principles of agricultural science in primary schools. We must get abreast of the empirical knowledge of the cultivator before it will be safe or useful to allow any teacher to arrogate to himself the right to teach Indian agriculture.

There is, however, one way of reaching the real cultivators, as desired by the Supreme Government, and that is by inducing them to come as apprentices to the farms. Something has already been done in this direction at the Bhadgaon Farm, and some of the apprentices have turned out superior farmers. Nothing, however, of real importance can be done in the way of teaching apprentices till accommodation is provided for them at the farms and till the number of farms is increased.

16. This brings us to the subject of agricultural improvement. Without anticipating the result of the deliberations of the conference to be held at Simla in October, we may say that there appears need for establishing experimental farms in the Southern Maratha Country and in Gujarat, and also, later on, in the Konkan. The principles which have been laid down —*viz.* that such farms should not be of large area, that the field of experiment should be as small as is compatible with the nature of the experiment, and that, the cost of pure experiment deducted, such farms should be made to pay their working expenses—are sufficient to prevent any extravagant expenditure. The necessity for more farms arises from the necessity of testing results obtained in one locality by those obtained in others, for without this to recommend imitation would be dangerous. The expenditure will consist in the small initial outlay on the purchase of land, if Government land is not available, and on the erection of a few farm buildings. And the recurrent expenditure will be only the cost of the Superintendent (say about ₹100 to ₹150 per mensem) and his clerical staff required to keep the strictest record of the cost of cultivation and outturn. The varying outturn of the staple crops of the Presidency cannot be said to be known with accuracy, and it is thus highly desirable that the farms should afford the necessary information. While the farms are called on to pay expenses, and to show a profit, except on the purely experimental area, it is only fair that the Superintendents should be allowed relaxations of the account rules as far as possible. No farmer can make his farm pay if he is not at liberty to turn his capital over as often as he can do so with profit.

17. As to other definite proposals which we are invited by Government Resolution No. 4175, dated 14th June, to make for this Presidency, we think it highly desirable that the Director should have funds at his disposal to import cotton and other seed which has experimentally been proved superior to local seed; to purchase locally and distribute at cost price seed which experimental trials have proved to be suitable; and occasionally to buy improved machines which he has reason to think can be introduced with benefit to the country.

This was the object of the grant of ₹10,000 per annum made in Government Resolution No. 8742, dated 29th November 1883, Revenue Department, but the Director informs us that this grant has been reduced to ₹3,000 this year. The original grant does not appear to us excessive, and we recommend that it should be provided for in future.

As to cattle-breeding, both for the plough and the dairy, we think that definite steps should be taken by the Agricultural Department. A small beginning has been made at the Bhadgaon Farm with the Mysore breed—essentially a plough breed. This might be extended to other localities where Government farms are established. But attention need not be confined to breeds useful for the plough. The Director informs us that he has submitted proposals to facilitate enquiry as to the relative merits of local milch breeds, and that he wishes to take up the question of crossing with foreign animals noted for their qualities as milch kine.

A scheme has already been submitted for establishing a farm at Alegaon to breed and feed sheep for Commissariat purposes, as much need exists for the improvement of sheep as of cattle, and we think that the Alegaon Farm might very well be utilised by the Director for dairy cattle as well as for sheep and plough cattle.

Cattle and Agricultural shows and Horse shows are held in various parts of the Presidency. In some places, they are combined. Most are aided by Government grants. As to Horse shows, we need say nothing; but we think that the Agricultural Department should now be enabled to take a more definite share in the encouragement of Cattle and Agricultural shows. Agricultural shows are largely attended by the cultivating classes, and tend towards improvement by exhibiting grains and other products—in many cases far superior to the products of the locality where the show is held. They bring cultivators together. They facilitate the distribution of superior seed. In the form of Cattle Fairs, they are an indigenous institution, and some of the most successful local shows are now held in connection with long-established fairs.

18. To sum up our proposals for agricultural improvement:—

(1) The number of experimental farms should be increased.

(2) They should be also cattle farms, to breed plough cattle for the cultivators.

(3) They should be used for the purpose of growing pedigree seed for distribution.

(4) As far as possible they should be adapted to receive apprentices of the cultivating classes.

(5) The Agricultural Department should have a liberal annual grant for the purchase and distribution of seed, whether locally or from abroad.

(6) And a similar grant for the purchase of improved machinery and implements requisite under the present conditions of husbandry.

(7) The Alegaon Farm should be made a dairy and stock farm under the Agricultural Department.

(8) On this farm and on others the improvement of sheep and goats should, when possible, be studied.

(9) The farms on their non-experimental areas, should, in the first instance, grow the staple crops of the locality in the best local method, before attempting innovations. The objects should be to thoroughly understand local practices, to try modifications suggested by experience and the principles of scientific agriculture on the experimental area, to test the results of modifications, and when they prove beneficial to demonstrate them to the cultivators.

(10) The Agricultural Department should be enabled to encourage Cattle and Agricultural shows.

The sanction of the post of Superintendent of Farms for the Presidency, which has lately been accorded, will make it possible for the Director to undertake the duties which we have sketched out, and will at the same time enable him to provide overseers to the farms at a moderate rate of pay.

G F. M. GRANT,
Commissioner, C. D.

H. E. M. JAMES,
Commissioner, N. D.

ALFRED KEYSER,
Acting Commissioner, S. D.

C. W. GODFREY, Colonel,
Acting Survey and Settlement Commissioner.

J. D. CRUICKSHANK, *Lieut.-Colonel, R. E.*
Superintending Engineer, C. D.

E. C. OZANNE,
Director, Land Records and Agriculture.

APPENDIX *to Bombay Committee's Report.*

Proposed modifications in, and additions to, the Bombay Famine Code.

Chapter I, Section I.—For "Agricultural branch of the Revenue Department, &c." read "Office of the Director, Land Records and Agriculture," and below, for "this branch" read "Revenue and Agricultural Department of the Secretariat."

REASONS:—When this section was drafted, no decision had been arrived at as to the special recommendation of the Famine Commission for the formation of a statistical branch in the Secretariat. The work which that branch was intended to do has gradually been taken up by the Director of Agriculture, and his office is, in fact, the statistical office of the Presidency; therefore the wording of the section should be altered as proposed. (*Vide* paragraph 4 of Government Resolution No. 6511, dated 1st September 1883.)

Chapter I, B:—Civil Officers.—This chapter deals with the duties of district officers and others in famine, but in Section 17 "duties before famine" are noticed, and between this and the next section should be added the special orders and set rules which the Government of India requires, *viz:*—

(*a*)* Every Circle Inspector shall in his weekly diary to the Mamledar specially notice all important facts bearing on the condition of the people, cattle, and crops, the supply of drinking water, prevalence of diseases affecting man or beast, and any sudden or important rise or fall in the price of food-grains and fodder. The rainfall in different parts of the circle must be described, care being taken to show whether it is seasonable and sufficient or otherwise. The diary shall be sent with the Mamledar's remarks to the Assistant Collector.

(*b*) For the purpose above mentioned it will be incumbent on the Circle Inspector to be in constant communication with the village officers under him, and should there be any such break in the rain as to give cause for apprehension, he should visit weekly one or two large villages in each of the several groups into which he should sub-divide his circle for the purpose and collect the requisite information from personal observation and enquiry.

(*c*) It shall be the duty of village officers at once to report the existence or prospect of any distress or failure of crops, fodder or water-supply or any unusual emigration from their

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* *Remarks:*—Rule (*a*). This rule is taken with slight verbal alterations from the Circle Inspectors' Rules sanctioned in Government Resolution No. 7214 dated 11th October 1886. Rules (*b*) to (*e*) and (*g*) are new. Rule (*f*) is in substance taken from the remarks below Taluka Form 37.

villages, to the Circle Inspectors, and to keep the latter informed of any change, whether for better or for worse, so long as the danger continues.

(*d*) On receipt of any adverse reports, the Mamledar and the District Inspector shall at once proceed to the tract represented as adversely affected, and communicate the results of their observations to the sub-divisional officer (Assistant or District Deputy Collector).

(*e*) It shall be the duty of district officers, as heretofore, to keep themselves informed of the condition and prospects of their charges, and primarily it will rest with them to make any proposals for relief of distress affecting men or cattle when, in their opinion, the necessity arises.

On receipt of any report of a serious failure of crops being imminent or probable in any portion of his charge, the sub divisional officer shall proceed forthwith to the spot and report to the Collector the result of his personal observation.

(*f*) As provided in Form No. 37 of the Taluka Manual, the Mamledars shall submit to the Director, Land Records and Agriculture, periodical rain returns, taking special care that the particulars specified in paragraph 3 of the remarks are duly filled in, *viz.* whether the rainfall was sufficient, normal or otherwise; whether it was particularly beneficial or injurious to any staple crop, or whether any defect or disease in crops is attributable to any particular fall or absence of rain for any period, and whether the rain promoted or retarded any agricultural operations; and make such additional remarks as may be called for as to the nature of the season and state of the crops, specially noting any adverse circumstances or sign of distress which may be indicated in the diaries of the Circle Inspectors.

(*g*) When in any district prices rise considerably (say 15 or 20 per cent.) above the normal rate, which can be ascertained by a reference to the average prevailing rate of a cycle of immediately preceding years, the Collector should report the circumstance to Government, stating at the same time how the rise is affecting the condition of the people, and to what cause or causes it may, in his opinion, be attributed.

Chapter I, Section 20.—We would prefer that "will" should be altered to "may."

Chapter I, Section 22.—We think that Assistant Collectors are too scarce and too valuable in times of famine to be thus utilised, and would prefer to alter the wording as follows:—"A Personal Assistant may be appointed."

Chapter IV, Section 114.—Add to the first paragraph of this section—

"and should coincide with the circles of the Inspectors on the Mamledar's staff. These Inspectors will be *ex officio* Relief Circle Inspectors in famine."

In the second paragraph, after "appoint as many" add "additional."

Chapter VI, Section 151.—The heading should be altered to—C. Relaxation of Forest Rules.

Insert new Section 151A before Section 151—

"When it appears to the Collector, in districts where edible fruits and roots are plentiful in forest reserves, that the privileges of collection enjoyed by wild tribes and special classes, should, owing to failure of crops, be temporarily extended to all classes, he may so extend them, reporting to the Commissioner and giving the necessary instructions to the Divisional Forest Officers."

In order that the existing copies of the Famine Code may be utilised we would not alter the numbering of any section, and the new additions, &c., may be incorporated by means of printed slips.

Extract from the Proceedings of the Government of Bombay, Revenue Department,—No. 5778, dated Bombay Castle, 15th August 1890.

READ—

Letter from the Commissioner, C.D., No. R.—3234, dated 11th July 1890—Forwarding a report, dated 8th idem, by the Committee appointed in Government Resolution No. 3664, dated 27th May 1890, to consider and report on certain questions raised by the Government of India in connection with the revision of the Famine Code and review of the position of the Department of Land Records and Agriculture.

RESOLUTION.—Government fully concur in the remarks and proposals made by the Committee in paragraphs 2—9 of their report dated July 8th, 1890, and approve of the alterations in, and additions to, the provisions of the Bombay Famine Relief Code recommended by the Committee.

2. The suggestion contained in paragraph 10 of the report is already under the separate consideration of Government, and the Director of Land Records and Agriculture has been

desired to propose arrangements to give effect to a scheme similar to that advocated by the Committee.

3. The Government of India may be informed, with reference to paragraph 12 of their Circular Resolution No. 63—77 C., dated December 19th, last, that as happily no famine has occurred in this Presidency since 1877-78, or since the preparation of the Bombay Famine Relief Code, no suggestion based on recent experience can be furnished concerning the relative advantages of a money dole, a grain dole, and the distribution of cooked food. No modification is deemed necessary in this respect of the existing Code which provides for the employment of these three methods of relief as the special circumstances of each case may require.

4. Orders will shortly be issued on the subject of the reform of the present Bhag karkun establishment and of the organization of the Agricultural Department establishment.

5. The Governor in Council entirely agrees in the observations and recommendations made by the Committee in paragraphs 13 and 14 of the Report. In the Deccan and other districts where they exist the hereditary kulkarnis may be able to keep satisfactorily; under careful supervision, the village statistics, and to perform crop inspections; but for the present at least, and for years to come, it will not be possible to entrust to them survey work in the form either of measurement or of classification. They do not possess the necessary technical knowledge, they cannot be expected to obtain the requisite qualifications, and even if they did it would not be expedient to devolve such important duty on men of their status and circumstances. They will, if duly supervised, carry out instructions, but they can originate nothing and are incapable of performing any tasks requiring scientific knowledge and training. The correct compilation of returns and statistics must depend entirely on the efficiency of the supervising staff, and as the members of that staff, the Circle Inspectors and others, are to be carefully selected and will have to pass prescribed tests, it may reasonably be anticipated that they will be able to perform this duty satisfactorily and to see that the kulkarnis carry out with accuracy and diligence their share of the work.

6. Government have perused with interest the remarks and proposals of the Committee on the subject of agricultural improvement and education, but will defer passing any orders thereon until the results of the deliberations of the Conference shortly to be held at Simla are known. In the meantime the Director of Land Records and Agriculture should submit a detailed scheme showing precisely how he would propose to give effect to the suggestions of the Committee and what expenditure the adoption of his scheme would involve.

7. Copy of the report of the Committee and of the orders passed by this Government thereon should be communicated to the Government of India.

APPENDIX C (*vide page 10 of Proceedings*).

Note by Mr. J. B. Hallen, *General Superintendent, Horse Breeding Department, on Dry Grass or Hay—How to make it good?*

Grass in India is, as a rule, cut when perfectly dry, and has become fibrous, possessing little nutritive properties; hence probably one reason why native horse-owners find it is necessary to give sugar and ghee, and thus make up for the want of similar chemical constituents in the dry grass.

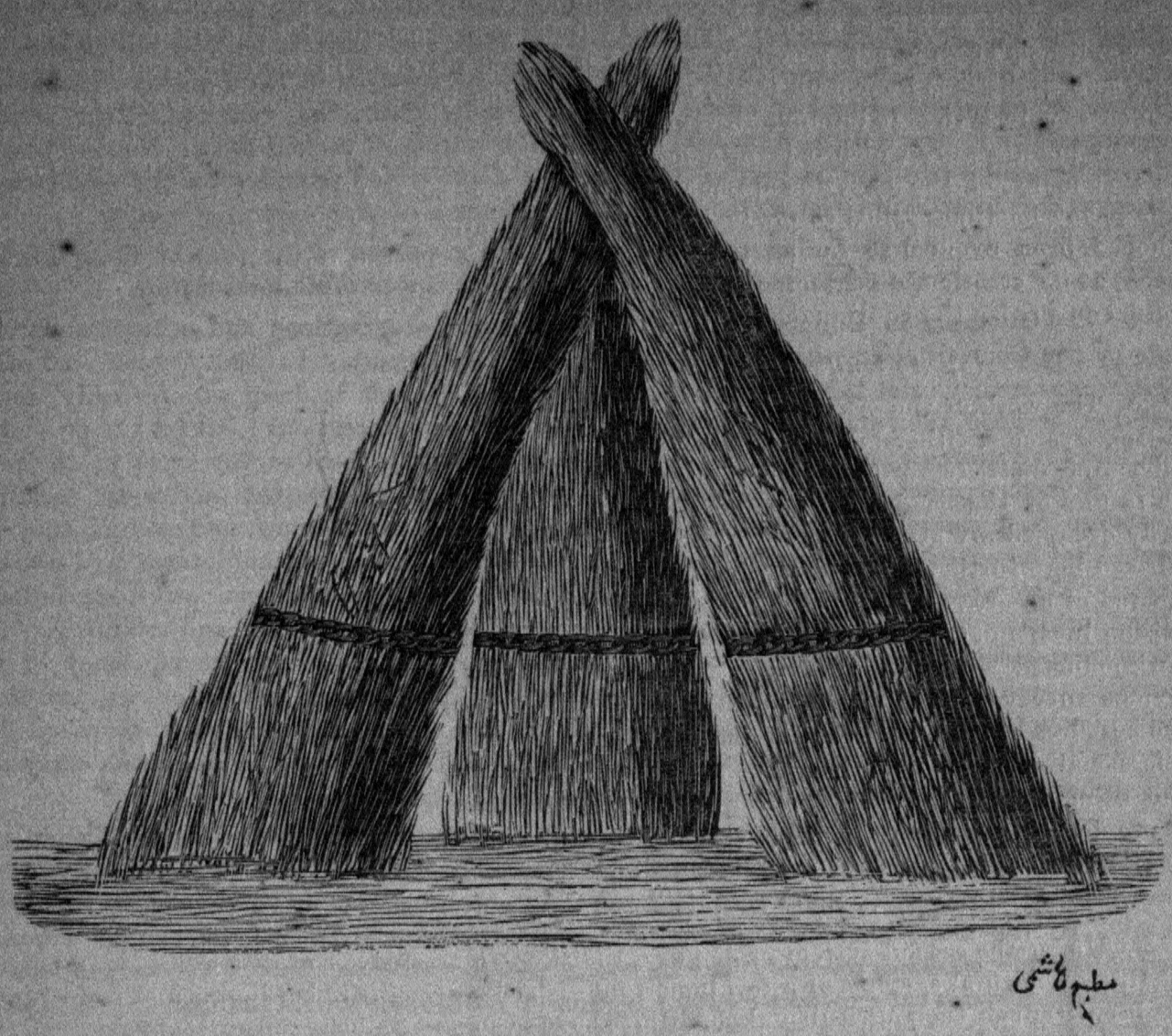
Grass for stacking should be always cut when green and in flower. The most simple way to prepare grass for stacking is as follows:—

Cut when green and in flower, tie up in bundles of about 8 to 10lb weight, and place three of such bundles on their broad ends leaning against each other as shown in the attached diagram. By this arrangement the grass will not become damaged by rain, and the central grass of each bundle will ferment and acquire more nutritious properties from containing saccharine and starch matter.

When the bundles are sufficiently dried they may be stacked. Dry grass thus prepared will be found very nutritious and sweet, and animals will eat it readily. It will be nearly as good as fair hay made in England and other countries. Proper hay-making requires much practical experience.

If the weather is hot, and sun powerful, grass will be dry enough, as a rule, in two or three days, and can be then stacked, but it should be stacked in small ricks, in case of any heating taking place, for if grass be stacked when too green or wet, it will surely heat too much, go beyond the fermenting process of making sugar matter, &c., and will become on fire.

A *little* heating makes the grass sugary and gives a very sweet odour, the odour of hay.



APPENDIX D (*vide page 36 of Proceedings*).

No. 1971 Agri., dated Calcutta, the 9th September 1890.

From—M. FINUCANE, Esq., *Director of Land Records and Agriculture, Bengal,*
To—*The Secretary to the Government of Bengal, Revenue Department.*

No. 1621—174 Agri., dated 2nd May 1890.
No. 2390—247 Agri., dated 11th July 1890.

WITH reference to your letters cited in the margin, I have the honour to submit the report called for on the points indicated.

2. It is pointed out in your No. 1621-74, dated 2nd May 1890, that the attempts made by the Government of Bengal to promote agricultural enquiry and improvement have in many cases taken the form of encouragement to private exertions, such as those now being made by silk-rearers to eradicate the disease of pebrine among silkworms, and the experiments of the Agricultural and Horticultural Societies. It is requested that I should review the results obtained by this method as well as by the more direct action taken on model farms, and that I should consider what further steps can be taken in the same direction. Report is also called for on the utilisation of village accounts, the form which they should take, and on the means by which they should be maintained.

3. In reviewing the work of the Agricultural Department on these points, it will be convenient to take them in somewhat different order from that suggested. The Government of India, in defining the duties of Provincial Agricultural Departments, declared that, as enquiry must precede improvement, the first and main duty of these Departments should be—not the conduct of agricultural experiments or the supervision of model farms—but the prosecution of enquiry into existing systems of agriculture and the complete and systematic ascertaining of agricultural and economic facts, so that Government may be in possession of adequate know-

ledge of the condition of the people of the country and of their resources. In more advanced countries the existing systems of agriculture, and the agricultural conditions of the various parts of them, are so well known that no enquiry is ordinarily required before undertaking experiments with a view to improvement. In India it is otherwise. The agricultural practices and conditions of different provinces, and of different districts in the same province, are so varied and so little is known of them, that it would be unwise to undertake agricultural experiments, with a view to improve the existing methods of agriculture, without first ascertaining what the practices are which it is intended to improve. It is owing to neglect of this precaution that many of the experiments made, and improvements attempted, in various parts of India have sometimes failed to produce satisfactory results. In Bengal such mistakes have, it is hoped, been avoided so far as it was possible for a Department to avoid them which was placed, at its creation, on a temporary basis, and from which immediate results were expected in order to justify the continuance of its existence.

(*a*) *Agricultural enquiry through surveys and records-of-right.*

4. The work of the Agricultural Department in Bengal commenced with an enquiry into existing systems, either (*a*) in the form of surveys and record-of-rights, or (*b*) in the form of analysis of districts, or (*c*) in the form of agricultural experiments in experimental stations. The results of the conduct of surveys and of the preparation of record-of-rights, which have chiefly occupied my attention and time during the past four years, need not, it is presumed, be reviewed here further than to say that a survey has been made and a record-of-rights has been prepared of an area covering 4,826 square miles; that these operations have extended to every Division in Bengal; that they have affected about half a million of raiyats; that they have been conducted without any of that friction and opposition which formed a concomitant of previous surveys and settlements whenever undertaken on a large scale in Bengal; that they have cost less than the rough and incomplete operations previously undertaken through non-professional agency; that they have already eventuated in a considerable increase in Government revenue, and that they have furnished valuable statistical information as to the condition of the people, the relative areas under various crops, the amount of the rents paid, and the system of agriculture followed in the areas affected.

(*b*) *Agricultural enquiry by analysis of districts.*

5. Under the second system of enquiry, that known as analysis of districts, it may be said that the agricultural systems of a few important districts—Dacca, Lohardugga, and Burdwan—have been studied, their agricultural conditions have been ascertained, and careful reports on the agriculture of them have been prepared. Similar enquiries are now being prosecuted in the Cuttack and Nuddea districts. The results of these enquiries may be briefly stated thus—

(i) They have given a knowledge of the native system of the agricultural and rural economy of these districts which was not before available.

(ii) Many things, such as green manuring, the Mauritius system of cultivating sugar-cane, the value of cowdung and of artificial manures, such as oil-cakes, are shown to be known to and fully appreciated by cultivators in certain districts, such as Dacca and Burdwan, where cultivators are intelligent and the advantages of resort to these manures has been brought home to their minds; while the value of cowdung is not so thoroughly appreciated and the use of artificial manures is unknown in the more backward districts, such as Lohardugga and the districts of the Patna Division, where cultivators are ignorant and the system of land tenures is insecure.

(iii) It has been found that Indian agriculture is not in all districts in that stagnant condition which has been sometimes supposed. Many improvements have been introduced, and the cultivation of many crops has been undertaken by the present generation of cultivators, which were unknown to their fathers. The progress made varies, however, in different districts, so that the cultivators of some districts have much to learn from those of others immediately adjoining them.

(*c*) *Agricultural enquiry by experiments in agricultural stations.*

6. In the natural course of events agricultural experiment with a view to improvement should begin when a sufficient knowledge has been acquired of existing system of agriculture and of the agricultural condition of a district. Such experiments were undertaken in Bengal on a small scale—

(*1st*) in an experimental station, at the expense of Government, at Seebpore, near Calcutta;

(*2nd*) in an experimental station, at Doomraon, at the expense of the Maharajah of Doomraon;

(*3rd*) in an experimental station, at Burdwan, at the expense of the Burdwan Raj.

A summary of the result of the experiments made at these stations is given below; it must, however, be noted that, as the experiments have been carried on for periods varying from only two to four years, it is manifest that these results cannot be regarded as conclusive, even as regards the districts in which the experiments were made, and still less as regards districts with different conditions of soil and climate:—

I—Crops.

Potatoes.

1st.—Potato seed imported directly from England succeeded well in the plains, and such seed as well as English seed acclimatised at hill stations yielded a heavier outturn and better quality than *deshi* (country) seed.

2nd.—High cultivation paid better than the ordinary method.

3rd.—A mixture of castor-oil cake and bone-meal proved to be a profitable manure for potatoes; the addition of bone-meal not only increased the yield but improved the quality.

4th.—In sandy laterite soil potatoes were much damaged by a species of red ant. The use of bone-meal as a manure either saved the crop, or very much lessened the injury done by white ants.

5th.—Cut sets were used with safety.

6th.—In the plains seed tainted with blight yielded a good crop, but the produce was inferior in keeping quality and rotted in July and August.

Sugarcane.

1st.—The red Bombay—a Mauritius cane imported by Major Sleeman—is not suited to the climate of Lower Bengal.

2nd.—Castor cake with some addition of superphosphate proved to be the best manure for sugarcane.

3rd.—In a year of drought no manure for sugarcane proved to be so good as cowdung.

4th.—As far as possible, manure should be used at the time of planting the cane sets and placed well below them.

5th.—Sugarcane is best grown in sandy laterite soils.

6th.—Saltpetre applied as a top dressing to sugarcane gave a net profit.

7th.—A modified Mauritius system of planting is probably better than the ordinary method.

Cotton.

1st.—The variety known as *khaki* did well in sandy laterite soil, and gave a heavy crop annually for four years.

Wheat.

1st.—The local Buxar variety proved to be better than the Mozuffernuggur wheat.

2nd.—Top dressing with saltpetre increased the yield and gave a large net profit.

3rd.—Green manuring with hemp gave an increased yield for the first and second years only.

Fodder crops.

Sorghum and yellow cholum were grown with advantage as fodder crops.

Jute.

Oil-cake applied as a manure to jute yielded a net profit.

II.—Ploughing.

Country bullocks of average strength are able to work the Seebpore or the Hindustani plough. Ploughing to a depth of five inches with a soil-inverting plough gave a larger yield, in uplands, than ploughing with the country plough.

Manures.

On light soils in the climate of Bengal no manure can properly be said to be insoluble. Crushed bones and horn shavings gave results the first year.

Practical measures to give effect to conclusions suggested by these experiments.

8. It has been already stated that it would be premature to assert that conclusions suggested by experiments continued for only a few years have been established beyond doubt, and for this reason such efforts as have been made to introduce the practices suggested by them have been made only on a small and tentative scale.

Cultivation of Buxar wheat.—Efforts have been made to introduce, or rather to have a trial given to the cultivation of, Buxar wheat in districts where it was previously unknown. The grain produced in such districts has been appraised by the Committee of the Bengal Chamber of Commerce and its value was compared with local varieties, the results being reported to the growers. The general result has been that the Buxar grain is valued more highly than local varieties, but Buxar wheat shows a tendency to degenerate where the land is not manured and irrigated.

Cultivation of acclimatised English potatoes.—English and Darjeeling potato seeds were sold to cultivators in Hooghly and Burdwan and grown with such success that large demands for these varieties arose. The cultivators of parts of the Hooghly district have since taken to the cultivation of acclimatised English potatoes.

Potato cultivation was also introduced, with beneficial results, in the Western Dooars of Julpaiguri and in the Manbhoom district.

9. *Bone-meal* was distributed among some raiyats of Government estates in Burdwan, Hooghly, and Jalpaiguri and was used by selected raiyats as a manure for sugarcane, potatoes, and paddy. The raiyats in question bear testimony to the efficacy of this manure, but allege that oil-cake at R1-8 a maund pays better than bone-meal at the same rate. Bones have recently been collected and broken with the common *dhenki* at a cost, inclusive of cost of collecting the bones, of R1 per maund. The raiyats of one village in Hooghly have bought 22 maunds of bone-dust at this rate and used it in the current year. Bones are now being crushed in the Jalpaiguri Jail with the *dhenki*, for sale to cultivators of Jalpaiguri, at the same rate. Bone-meal is also being made and used by some indigo planters in Behar.

Efforts to promote agricultural enquiry and improvement by encouragement to private exertions.

10. The attempts made to promote agricultural enquiry and improvement in Bengal by encouragement to private exertions may be classed under three heads:—

1st—Aid to the Bengal Silk Committee in the conduct of experiments with a view to the eradication of pebrine.

2nd—Aid to the Agri-Horticultural Society, the members of which it was thought would undertake agricultural experiments, and would, where they found the results successful, use their influence in introducing the improved methods suggested by these results in their neighbourhood.

3rd—Assistance and advice to private individuals, such as the Maharaja of Doomraon and managers of Wards' and private estates, in the introduction of new crops in the trial of new implements, and supply of good seed.

11. *Aid to the Bengal Silk Committee.*—When the Indo-Colonial Exhibition was held, in Calcutta, the Government of India, in reviewing the various products of the country, with a view to determine which of them was most likely to reward efforts for the promotion of their development, decided that silk was the product for which there was most hope. By the wish of the Government of India and of the Secretary of State, Mr. Wardle came to India "to give encouragement to the extended production of tussur silk and to see how it was that Bengal silks had fallen into disrepute within the past twenty-five years." He attributed the decline in the silk industry of Bengal to the high and differential rates of rent which, he had been informed, were charged for mulberry lands, to the failure of cocoons owing to the want of proper selection of seed by native breeders, to the defective arrangements for reeling, and to the introduction of more profitable staples, such as sugarcane and potatoes. In the course of enquiries instituted with reference to these alleged causes, it came to light, shortly after the creation of the Agricultural Department in Bengal, that perhaps too much importance had been attached to some at least of the causes above specified, and it was stated that the decline of the industry was in a great measure due to the ravages of a disease which had broken out among silkworms in recent years and threatened to ruin the industry. An enquiry was instituted by the Government of India, and it was reported by Mr. Wood-Mason that this disease was that known in Europe as *pebrine*, which had been successfully combated by M. Pasteur's system, by which moths intended for seed are microscopically examined and the eggs of such as are found to be diseased are rejected. In order to make himself practically acquainted with this system of microscopic examination, Mr. N. G. Mookerjee, who had received an Agricultural education at Cirencester at the expense of the Government of Bengal, was deputed by

the Government of Bengal to Paris to learn in M. Pasteur's laboratory the method of microscopic examination there followed. The result was that it was established beyond doubt that the disease from which silkworms were suffering in Bengal was pebrine, and it was determined that efforts to eradicate or mitigate this disease should follow the lines adopted by M. Pasteur in Europe. A committee of gentlemen interested in the industry was formed with a view to giving practical effect to these measures. Mr. Mookerjee's services were placed at their disposal and a contribution was made by the Local Government of R5,000 per annum for the purpose of introducing and carrying out M. Pasteur's system of microscopic examination, on the condition that at least an equal amount should be subscribed and expended for this purpose by private individuals. It is premature at present to say what the results of these attempts to eradicate pebrine, on the lines above indicated, may ultimately be. All that the committee can now assert is, that "where properly-selected and carefully-examined seed has been issued a perfect crop was the result." In addition to the examination and selection of healthy seed under Mr. Mookerjee's immediate supervision at Berhampore, a plan has recently been adopted of helping private gentlemen, residing at a distance from the Bengal silk districts, to rear seed according to European methods, and to get the crop so reared distributed as seed in the silk districts which are infected with pebrine.

Agricultural enquiry through the Agri-Horticultural Society.

12. The Agri-Horticultural Society has received since 1886 a subsidy from the Government of Bengal of R6,000 per annum on the condition that it takes charge of and places in its rooms in the Metcalfe Hall, so as to make them readily available to the mercantile community, such articles of economic value as Government may deliver to it for custody, and that it conducts, through its members, such experiments in economic products as may, from time to time, be suggested and considered desirable. Pending the collection of economic products for the new Economic Museum now under construction, it has not been possible to place a large collection of articles of economic value in the Society's rooms. In order to give effect to the latter part of the arrangement, a scheme was drawn up, with the approval of Government and of the Council of the Society, for the conduct, through its members, of certain experiments designed with a view to test the relative values of certain manures, of using a soil-inverting plough as compared with the country plough, of early ploughing as compared with late ploughing, and of the merits of Buxar wheat as compared with local varieties. It cannot be said that any of the members of the Society have made any sustained effort to carry out any of these experiments, or that any results of value have been obtained.

13. In the preceding paragraphs a summary has been given of the efforts made to—

(1) investigate the existing agricultural practices of parts of Bengal;

(2) to make experiments in small experimental stations with a view to test the value of certain suggested improvements;

(3) to apply the results tentatively and on a small scale.

It could not have been expected, in so short a time, and with the agency of only two assistants, who were employed on this branch of the duties of the Agricultural Department, that any striking results would be attained, and it cannot be pretended that any great or striking results have been attained. It remains to consider what further steps should be taken in the same direction.

Further steps in the same direction.

14. It appears to me that the direct action of Government in the introduction of changes in the agricultural practices of a country like India cannot at best have any great effect for many years to come, unless and until Government is prepared to expend very much larger amounts on this branch of administration than it is at all likely to spend, or perhaps than it would be justified in expending, in the permanently-settled districts of Bengal. It has been already stated that where primary education is spreading and intelligence is awakened by communication with the outside world and reasonable security of tenure prevails, there cultivators do not wantonly waste the manurial resources at their disposal, and are even resorting to artificial manures. Where, on the other hand, as in Behar and Chota Nagpore, the body of the cultivators are ignorant and the tenure of land is insecure, there cultivation is backward, and attempts to introduce improvements are, and will be, futile. For this reason I am of opinion that it is of cardinal importance, in connection with the question of improvement of the agricultural practices of the country, that primary education should be spread and that reasonable security of tenure should be guaranteed. It is not within my province to suggest the means by which funds may be made available for the extension of primary education. Whether the whole system of what is called higher education in Bengal is not too much of

a literary as distinguished from a physical and practical character, whether a large portion of the funds now devoted to higher education should not be devoted to primary education, and whether an education rate should be imposed—these are large questions which it would be out of place to discuss on the present occasion. As to the second point of cardinal importance—security of tenure and the necessity of a survey and record-of-rights in order to attain it—much has already been written by me, and it would serve no useful purpose to repeat my views here. Mr. Sen's report on Dacca shows that, with a population of 756·65 to the square mile on the entire area and a very much larger population on the cultivated area (much of the district is under jungle), the people of that district are prosperous, and the system of agriculture comparatively progressive; while in such districts as Chumparun and Lohardugga, with a population of only 487·57 and 133, respectively, to the square mile, it is known that the cultivators are lamentably poor, and the system of agriculture backward and stationary. The cause of this poverty and backwardness in the latter instances appears to me to lie more in the ignorance of the cultivators, and in the apathy entailed by insecurity of tenure than in the number of the population pressing on the resources of the soil. But while thinking that spread of education and security of tenure will ultimately have more effect on improvement of agriculture than any direct efforts of Government, by way of encouragement of improved practices shown in experimental farms to be beneficial, or by farms, agricultural shows, or the like, I am at the same time of opinion that much may also be usefully done, at a moderate cost, in the latter directions.

Establishment of an Agricultural College at Seebpore.

15. It is obvious that without some sort of agency possessed of an agricultural education and training, it is impossible for an Agricultural Department to effect any substantial agricultural improvement, and it seems equally obvious that, given such educated and trained agency, it will be impossible for Government to reach the masses of the agricultural community, in the matter of agricultural improvement, unless the sympathies are enlisted of those who are looked to by the cultivating classes as their natural leaders. Bengal at present stands alone, in being absolutely without the means of imparting agricultural education and training of any kind either to the servants of Government who may be employed in the Agricultural Department and in the management of estates, or to the sons and agents of zemindars and cultivators who may be desirous of such training and education. It appears to me to be eminently desirable that the means of imparting such education should be provided, for there is no part of India in which there is more likelihood of such education and training being appreciated and subsequently taken advantage of. Bengalees have surpassed the inhabitants of other provinces in other walks of life, as pleaders, doctors, engineers, and there is no reason to suppose that they would not take advantage of opportunities to acquire and make use of a knowledge of agriculture and of the sciences connected with it, if such opportunities were placed in their way. Those who maintain that agricultural education is useless, that the raiyats' practice admits of no improvement, are consistent in refusing the means of an agricultural education; for if such education leads to no useful results, then the Bengalee will not be slow to find this out; but for those who believe that existing practices are susceptible of improvement with profit, it is difficult to overrate the importance of imparting to the better-to-do classes connected with land an agricultural and practical education which will divert their minds from chimerical literary and political pursuits, and give them important practical subjects on their own estates, on which they may interest themselves. Proposals have already been made for the establishment of an agricultural college or school at Seebpore at a moderate cost. I would take this opportunity of renewing and inviting attention to that proposal.

16. The proposals made for imparting education, of a high character, to Bengalees and others at Dehra Dun do not affect the necessity of having an agricultural school at Seebpore, for the education at Dehra Dun cannot be agricultural—

(*1st*) because there is no agricultural land there, and

(*2nd*) because the education to be given at Dehra Dun is to be of a high character, for which some preliminary training is required elsewhere.

Attached to the agricultural school at Seebpore it is necessary that there should be an experimental station, where well-devised experiments may be carried on with scientific accuracy, and a demonstration farm in which the students may take a part in the actual work of farm operations.

Elementary agricultural education.

17. In addition to the higher class of agricultural education provided in the proposed college, elementary instruction may be given in primary schools. An agricultural primer has lately been adopted as a text-book in these schools.

Experimental agricultural stations. Requisites for conduct of agricultural experiments.

18. Over and above the agricultural college and the experiments conducted in the station attached to it, experiments should be conducted, under skilled supervision, in the various parts of the country of which the soil and climate and systems of cultivation are broadly and distinctly different from those prevailing in Calcutta and its neighbourhood. The requisites for the proper conduct of these experiments are—

1st—The sites of the experimental stations should be so selected that they may be typical of as large areas as possible.

2nd—The soil of the various plots on which experiments are made at each experimental station should be uniform.

3rd—The experiments should be devised with a definite object, after enquiry into the system of agriculture practised in the locality, and they should be made with a view to the introduction of definite and practical improvements, if the experiments show profitable results.

4th—They should be carried on continuously for a number of years on the same plots.

5th—The soil should be analysed.

19. With the establishment at present available, I do not think it desirable to open any new experimental stations. The three stations already established are quite as much as can be supervised by the agency now employed; but if funds were available, and this agency were strengthened, it would, in my opinion, be desirable to establish additional experimental stations in Eastern Bengal, Orissa, and Chota Nagpore. Provision should be made for the permanent retention, in the Agricultural Department, of the officers engaged in the supervision of experiments and their numbers should be increased.

Establishment of a veterinary school.

20. The establishment of a veterinary school in Bengal has been already recommended, and the necessity for such a school has been admitted.

Utilisation of village accounts.

21. As regards the utilisation of village accounts, and the form which they should take, my views were reported at length in my letter No. 767, dated 19th November 1885. That report was written on the assumption that it had been decided that a Patwari Bill was to be passed, and that the system followed in the North-Western Provinces was to be introduced, in its entirety, in Bengal. In Government estates held under khas management in which raiyats' accounts are kept by Government as landlord, the registers and forms of account given in the draft rules annexed to the letter above cited may be adopted. In permanently-settled tracts no arrangements for maintenance of village accounts can be made without legislation; but in temporarily-settled tracts, like Orissa and Chittagong, now under survey and resettlement, arrangements may, if it is thought desirable to do so, be made, at the time of settlement, for the appointment of patwaris, whose duty it would be to keep up registers in forms similar to those prescribed in the North-Western Provinces. These registers contemplate—

(1) the keeping of rent accounts, by the patwari, between landlords and their tenants;

(2) the keeping of records of all mutations of holdings by transfer, inheritance, or otherwise;

(3) the collection of statistics, year by year, after field-to-field inspection of the area under every crop.

22. It is clear that accounts and registers of this character cannot be kept up without an expensive agency, whether that agency is paid directly by the landlords concerned or by the raiyats or by Government. If the obligation to pay patwaris is imposed on the landlords and is really enforced, it is manifest that this fact must be taken into consideration in fixing the amount of Government revenue to be demanded of them, and therefore that the whole or a portion of the cost of such agency must ultimately fall on Government. Where, as is the case in the North-Western Provinces and elsewhere, such agency already exists, it is obviously desirable to utilise it for the purposes indicated, and one important effect of so utilising it is that the necessity for new surveys on the expiration of the term of settlement is obviated; but it may be a question for consideration at the conference whether, in parts where no such agency exists, the results to be achieved, even if successfully attained, are worth the expense which must be incurred in the creation and maintenance of such agency. According to the North-

Western Provinces rules, a patwari is appointed for an area of 1,500 acres of cultivated land, or (say) of four square miles, inclusive of waste, and he receives a salary of R7 per month. A temporary settlement ordinarily lasts for thirty years, so that the patwaris' salary for this period amounts without interest to R2,520, or R630 per mile, and this is exclusive of the cost of supervision of the patwaris by canoongoes and others. A resurvey and settlement on the expiration of the term of thirty years would not cost half of this amount. It follows that it would be cheaper to have a new survey and settlement every fifteen years than to maintain the records from year to year by the agency of patwaris, thus avoiding the necessity for a new survey. If, then, the creation of such agency is to be justified at all, such justification must be on grounds other than financial. These other grounds are, that the patwari keeps correct accounts as between zemindars and their raiyats, and thus protects the latter from fraud, and that he collects and furnishes accurate statistics which may be utilised for famine and other administrative purposes. The question for consideration is whether the protection afforded to the raiyat by patwaris' accounts, and the statistics of cropped areas collected by them, are worth the extra expense involved in creating and keeping up patwaris, and also whether the information required for administrative purposes cannot be obtained in other ways. It appears to me that if accurate maps and records are prepared, if copies of them are made over to the landlords, and if the obligation is put upon the landlords, by law, of furnishing such returns of mutations of holdings and statistics of crops as are now furnished by the patwaris in the North-Western Provinces, there is no reason why landlords may not be brought to furnish sufficiently accurate returns of this kind without patwaris. In this case landlords may be left to make their own arrangements for keeping their raiyats' accounts and for furnishing statistics of crops, and all that Government need do would be to provide an agency, such as that of canoongoes or Sub-Deputy Collectors, to check from time to time the accuracy of the returns furnished by the landlords. It is impossible for zemindars in Bengal to furnish accurate returns of cropped areas, or of mutations of holdings, without maps and village records; but given such maps and records, there is no reason why they should not be brought to do so, under penalties for failure, such as are provided in the Road Cess Act. The effect of carrying out a scheme of this kind would be that Government would be relieved of the gigantic task of keeping accounts between landlords and tenants, and would be also relieved of the necessity for that constant and irritating interference which is involved in the appointment of a Government patwari in every village, while the information and statistics required for administrative purposes would at the same time be obtained, and a financial saving would be effected. If this principle were adopted, the returns which zemindars might be asked to file need not be either numerous or complicated. Those annexed to this letter would probably suffice, and zemindars might be left to make their own arrangements for compiling the necessary information for filling them up. If Government are prepared to incur the expense of creating and paying patwaris according to the North-Western Provinces system, that system would probably be more thorough and efficient; but if not, then the system now suggested may, perhaps, be worthy of consideration.

Proposed Registers.

I.—Return of mutation of names on account of transfers by sale, inheritance, or partition of holdings.

1	2	3	4		5	6	7	8
Number of khatian according to settlement records.	Name of raiyat in settlement record.	Name, father's name, caste, and residence of new raiyat.	Field number of plots.		Area of holding.	Rent.	Status of new raiyat; whether occupancy or non-occupancy.	Remarks explanatory of nature of the transfer; whether by sale, inheritance, or partition.
			In old holding.	In new holding.				

II.—Return of deceased and absconded raiyats whose holdings have not been resettled.

1	2	3	4	5	6	7
Number of khatian according to settlement records.	Name of deceased or absconded raiyat.	Area of land.	Rent.	Date of relinquishment or abandonment of holding.	Cause of relinquishment or abandonment of holding.	Remarks.

III.—Return of new settlements of waste lands and abandoned holdings.

1	2	3	4	5	6
Name of raiyat.	Number of fields according to the settlement records.	Total area of holding.	Rent.	Remarks explaining whether the land was waste or abandoned holding.	Remarks explaining how the rent was fixed—according to the settlement rates by written contract or otherwise.

IV.—Crops cultivated. Abstract of totals of areas under each crop.

District.	Total of cereals and pulses.							Oilseeds.	Sugarcane.	Fibres.							Indigo.	Coffee.	Tea.	Tobacco.	Cinchona.	Miscellaneous.						Total area of crops.	Deduct area cropped more than once.	Actual area on which crops were grown.
	Rice.	Wheat.	Other food-grains, including pulses.							Cotton.	Jute.					Other sorts.						Food-crops.					Non-food-crops.			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31

Note.—The headings may be altered according to the crops grown in the locality.

APPENDIX E (*vide page 37 of Proceedings*).

Extract from the Proceedings of the Government of Madras, Revenue Department,—No. 515, dated 4th July 1890.

READ—

The Report of the Agricultural Committee, appointed by G. O., dated 25th September 1888, No. 686, Revenue.

ORDER.—Towards the end of 1888, His Excellency the Governor in Council appointed a Committee, consisting of the gentlemen noted on the margin, with the subsequent addition of the Director of Public Instruction, to institute a comprehensive inquiry into the past working of the Agricultural Department and the College of Agriculture and to make suggestions for the conduct of operations in the future.

W. Wilson, Esq., M.A., C.S., *Chairman.*
Rajah Sir T. Madhava Row, K.C.S.I.
Hon. P. Chentsal Row, C.I.E.
J. Grose, Esq., M.A., C.S.
F. A. Nicholson, Esq., C. S., *Secretary.*
J. Adam, Esq., M.A.
Rai Bahadur A. Sabapathi Mudaliar Avergal.

The Committee held eighteen meetings, examined many witnesses orally and received numerous replies to sets of interrogatories issued by it; it considered notes of suggestions from various gentlemen connected with agriculture or interested in the improvement of agricultural methods and knowledge; and its investigations were further assisted by two valuable papers contributed by Messrs. Nicholson and Benson. The result of its labours is a most interesting report, in which all the various branches of the question of agricultural progress in India have, it is believed for the first time, been brought together and thoroughly discussed.

2. The report, however, contains no summary of the Committee's conclusions and recommendations, and owing to this defect it is desirable to recapitulate here at greater length than would perhaps otherwise have been necessary the opinions which the Committee has formed regarding the results that have hitherto been obtained and the lines on which the Administration of the Department should proceed in the future.

Lines of inquiry.

3. In order to indicate to the Committee the matters upon which its opinion was desired the Government suggested in the order appointing it that attention should be directed to the following points:—

(1) What benefit has accrued or is likely to accrue to the cultivating classes from the Agricultural Department as at present constituted?

(2) What improvement it has effected or is likely to effect in seeds, implements, breeds of cattle, sheep, and horses and methods of cultivation throughout the Presidency?

(3) What inducements does it hold out to raiyats to improve their stock and mode of agriculture?

(4) Its operations in regard to cattle-disease, and the benefits resulting from those operations.

(5) The operations in connection with, and the benefits derived from, the stock farm administered by the Department, with financial results.

(6) Whether the breeding of stock can be properly or economically carried on by Government?

(7) The duties of the officers employed under the Department.

(8) The best means of increasing the efficiency of the Department, having special reference to the benefit of the agricultural community.

(9) The course of study pursued at the College of Agriculture.

(10) The class of students at the College and the conditions under which they come to it.

(11) Whether the students engage in agriculture after leaving the College?

(12) Whether the College ought to remain under the control of the Director of Public Instruction?

(13) Whether the Agricultural Department ought to continue to be administered by the Board of Revenue?

(14) Whether the Agricultural Department ought to be restricted to matters connected with agriculture?

Operations in the past.

4. As regards the past the Committee has very little that is favourable to report. Large quantities of seeds have been distributed and some new varieties introduced, but the practical results to the raiyats have as yet been but trifling. Many varieties of ploughs have been brought to

the notice of the cultivators, but though numbers have been bought they are very little used and have not found general favour with the farmer. The introduction of the Beheen sugar-mill, however, has met with greater success, and its superiority to the old wooden mill is now generally recognised by the raiyat. The efforts made by the Department towards the improvement of the breeds of cattle, sheep, and horses have been insignificant and spasmodic. The attempts to induce the raiyats to breed a better class of pony, which have been made in the districts of Salem, Coimbatore, and the Nilgiris by giving the services of good sires free of charge, have been fairly successful, and the prospects of this undertaking are encouraging. A few bulls and rams have been distributed, and a cross-breed of sheep was established at the Saidapet Farm, but without any appreciable result so far as the raiyats are concerned, and it is more than doubtful whether these bulls and rams were better or more suitable for the raiyats than animals taken from many very good breeds which exist in the Presidency. A stock depôt was established in December 1887 with the intention that it should form a centre for the distribution of bulls and rams. The Government is of opinion that the establishment of such a stock depôt is a mistake, and that if it were considered desirable to provide bulls and rams for distribution (which it is not), that object would be obtained more economically by purchase in the open market. The Government further ascertained that the system of breeding going on upon this stock depôt was calculated to lead rather to the deterioration than to the improvement of stock. The depôt was accordingly closed after it had been in existence for about a year. The experiments conducted at the Saidapet Farm with the object of showing how the agricultural methods of the country could be improved are reported by the Committee to have been fairly successful, and the demonstration of the value of deep tillage and the possibility of growing fodder crops is adduced in support of this statement. But the advantages were not shown to the raiyat and the practical results have, therefore, been inconsiderable. The Committee finds that the Department has been able to hold out very little indirect inducement to the raiyats to improve their stock and mode of agriculture. The most important of the measures taken with this object in view are the agricultural exhibitions that have been held from time to time, but strong doubts have been raised as to their success and usefulness. Private enterprise has to some extent been fostered by the encouragement accorded to the efforts of the late M. R. R. Krishnaswami Mudali of Shiyali to introduce better systems of farming, by the gift of stock and implements to the Mission Farm at Karur, and by a grant-in-aid to the Madura Farmers Club. It is, however, clear that the few endeavours which the Department has made to indirectly induce improvements have been as little fruitful in practical results as its more direct efforts.

The work of the Cattle-Disease Department will be dealt with at greater length below, but it may be noted here that while the Committee considers it has done appreciable good, Inspecting Veterinary Surgeon Shaw describes the subordinate staff as insufficient and inefficient, and several witnesses state that the Stock Inspectors are useless and command no confidence.

In the province of agricultural education also the results are similarly disappointing, though indirect good has possibly been effected. The only agency that has been at work is the College of Agriculture at Saidapet, and the Committee was asked to report upon the class of students that attend it, the conditions upon which they come to it, and whether they engage in agriculture after leaving the College. The Committee finds that a very great majority, possibly 90 per cent., of the students are either landholders or members of landholding families; there are, however, few sons of large landholders and in Appendix E. there is an overwhelming mass of evidence that the sole object with which most of the students join the College is to obtain employment or promotion in the Government service. Out of 187 Saidapet graduates regarding whom information has been collected, only 39 are engaged in farming; but though the College must be held to have somewhat failed in directly influencing agriculture, the Committee considers that it has nevertheless given a fair return to the country for the money spent upon it, while the attention it has excited throughout India and the undoubted good it has done during the time it has been in existence, imperatively demand its continuance.

5. It will be seen from the foregoing summary of the Committee's investigations that the amount of real good secured by all the efforts of the past has been infinitesimal, and that the greater part of the money which has been spent on agricultural improvement and education has been wasted. With the best intentions on the part of various Governments, all endeavours to advance practical agriculture have failed, and the only result of the operations of the Department has been the awakening of an interest which possibly might have sprung up

independently. But the causes of the general want of success which has hitherto attended nearly all the measures undertaken by the Agricultural Department are very clearly shown in the Report and its appendices, especially in the Note by Mr. Nicholson, who gives the following excellent recapitulation of what has been done and of the reasons of failure :—

Causes of failure.

"The original idea of 1865 was that the raiyat wanted complete teaching ; his practices and implements were all to be altered : a farm, originally model, was started to teach him his business ; example gave way to experiment ; experimental farms required superintendents, and superintendents required education ; experiment gradually gave first place to education ; education turned out book-men for whom no farms were ready, nor were they ready for farms ; experiment was subsequently entirely abandoned in favour of inquiry ; inquiry has largely dwindled to the collection of statistics ; positive improvement barely exists ; the only considerable operations are those against cattle disease ; even this latter organization is described by Dr. Shaw as insufficient and inefficient and a disgrace to a civilised country. There has been no planned-out design, no foundation of inquiry, no continuity of structure ; the organism of 1865, conceived in error, born by chance, bred by accident, developed in starvation, guided by change, never had any vigorous vitality. There was in fact no real department till 1882 : the Saidapet Farm was in some ways a department, but it lacked the necessary machinery and organization ; it was isolated and wanting in almost all means of access to and by the people ; only by occasional correspondence and by casual visits from the public, and by its reports, could it have any outside influence, in the way of disseminating, through precept and practice, the information it had gained or of suggesting and inculcating new ideas. The Department was, moreover, wholly under-manned ; its three experts—Messrs. Robertson, Benson, and for a time, Schiffmayer—were chiefly occupied with farm and college duties, and could not work continuously and closely at the numerous investigations suggested or thrust upon them from time to time, and which required the organized staff of a department. After the change in 1882 the staff was practically confined to one officer (Mr. Benson), since Mr. Schiffmayer had retired and Mr. Robertson was entirely occupied with college work. Even the graduates trained for agricultural work at the college were in the end not of much use, for they were not of the raiyat class ; they had no definite and assigned future ; they had no farms on which to demonstrate what they had learnt ; and had there been farms, they, as for the most part theoretically trained, could not have worked them. There was no organization reaching from the Government through the Board and the Director to the districts and villages ; there was not, and is not to this day, any attempt to carry out what in the opinion of the Government of India should be 'the earliest ambition of the Agricultural Department,' *viz.* "to secure the active aid of those members of the native community who are sincerely interested in agriculture. There has been no effort to organize associations in every district in touch with the central bureau and ramifying into every important village, so as to provide the means of obtaining and disseminating information, and of carrying out well-chosen experiments usefully and successfully ; experiments otherwise than on the farm were casual and fitful : they were seldom carried out in ultimate fact by experienced hands or interested brains ; they were not properly supervised ; they were conducted in an amateur half-hearted way ; the experiments whether with seeds or implements were often ill-chosen and doomed to failure either from want of intrinsic suitability or from want of knowledge of indigenous practices and conditions which rendered unsuitable experiments otherwise well-chosen ; they were too occasional and seldom repeated ; frequent failure caused indifference and suspicion. These were all faults of ignorance either in the suggesters of the experiments or in the experimenters ; they would not have occurred had there been a department of wide knowledge and full experience of native and especially local practice and conditions properly organized to devise and carry out well-chosen experiments, either direct or by suitable experimenters. The great fault was, not that there was incessant change, but that there was no decided plan of operations, so that change was a necessity ; that there was no organized department to carry out such a plan, and hence that there was discontinuity and feebleness of purpose."

6. To ensure success, then, in the future it is of paramount importance that a definite policy should be carefully worked out and authoritatively laid down, and that this policy should be steadily adhered to or at least should not be condemned until it has had a fair trial. It is obvious that measures of this kind, intended as they are to modify systems crystallised by the habits of centuries in a people never quick to adopt innovations, must of necessity be slow in their operation, and His Excellency in Council cannot too strongly deprecate any hasty forming of adverse conclusions because no demonstrable results are forthcoming for record in an annual report. There can be no doubt that Indian agricultural methods are susceptible of improvement, but the efforts to this end must be long continued, and unless the officers entrusted with their conduct have the cordial support and confidence of the Government, nothing but failure can be expected.

Requirements for success.

7. The first matter for consideration, therefore, is the nature of the policy which should now be adopted, and His Excellency in Council will accordingly proceed to discuss the recommendations which the Committee has made for the future administration of the department. These are grouped in the Report under the following six main heads :—

Recommendations of Committee.

(*a*) The improvement of all aids, and the removal of all hindrances, to the stability and efficiency of agriculture ;

(*b*) inquiry and research ;

(*c*) experiment and demonstration ;

(*d*) the introduction of positive improvements;
(*e*) a proper staff and organization;
(*f*) a developed system of education both as regards school and college tuition, and as regards the general stimulation of the agricultural public.

Each of the above heads is expanded in considerable detail, but the chief features of the policy proposed are, (1) the institution of a careful and definite system of inquiry into existing practices, (2) the inauguration of experiments under the control of trained agriculturists, and the demonstration of the results to the raiyats, and (3) a comprehensive scheme of agricultural education.

Inquiry and research.

8. The importance of inquiry as an essential preliminary to any original endeavours to improve Indian agriculture has been strongly insisted upon by the Government of India, but the analysis of districts which was in consequence undertaken in this Presidency consisted mainly of the compilation of statistics which had no direct bearing upon agricultural methods. The Committee, therefore, suggests that the duty of collecting this information should be entrusted to a special account staff, and proposals with this object in view have already been submitted to the Supreme Government. If these are accepted, the Agricultural Inspectors will be available for other work, and it is recommended that a certain number of them should be employed on a careful and minute study of agricultural practices, their work being carefully directed and supervised by European experts. The latter would also be required to prepare detailed reports on agriculture and rural economy, and the work of inquiry will be further prosecuted by issuing sets of questions to trustworthy sources of information, the answers being collated and published in the form of monographs.

Experiment and demonstration.

9. The Committee proposes that experiment and demonstration should be carried on at special farms, "to be established whenever and wherever suitable superintendents, thoroughly acquainted with the conditions of the country, can be obtained." It is pointed out that such farms would not be expensive, as they need not exceed 30 acres in extent, and it would not usually be necessary to acquire the land outright. The Committee is informed that five or six farms could be started at once, and that it would be possible to have one in every accessible district within two or three years. For experiments with special crops, such as cotton and tobacco, the Committee recommends distinct experimental stations, and though it is not at present in favour of a Central Farm, it considers that it may eventually be advisable to utilise one of the district farms for such further research and experiment as would ordinarily be carried out at a central institution.

The Committee further urges that Local Boards, Associations, and private individuals should be encouraged to conduct experiments and demonstrations; and it concludes this portion of its Report by recommending the wide and persistent publication of successful results.

Education.

10. The question of education is dealt with at great length in the Report, and the importance of it as a means towards agricultural improvement is strongly insisted upon. Dealing, first, with indirect education, the Committee recommends the abolition of the present system of exhibitions and the substitution of prizes for fields or farms or specific items of farm management, a subject on which much interesting information is contained in Mr. Nicholson's Note. It is also recommended that the diffusion of practical agricultural knowledge should be further stimulated by publishing the results of successful experiments and other useful information or suggestions in a popular form, by means either of a Departmental journal or casual papers.

School and College Education.

But it is to school and college education that the Committee attaches most importance, and more than half of the Report is devoted to this subject.

A Central College.

With reference to the Saidapet institution, the Committee lays down the proposition that a Central College is absolutely essential for the training of the necessary agricultural experts and teachers and the provision of veterinary education. It recommends that there should be two courses in agriculture, corresponding to the two tests under the Technical Education Scheme; that a separate branch of the College should be established for providing veterinary instruction, and that *Forestry* should be added to the list of subjects which are now taught. It suggests the revision of the present course of study and recommends that the system of working the farm annexed to the College should be radically altered so as to make the practical

instruction more varied and complete and allow of more individual attention being given to the students.

Agricultural instruction in schools.

Turning next to the more difficult problem of school education, it is pointed out that *Agriculture* is already an optional subject in Standards IV, V, VI, and VII, and in the Primary, Special Primary, Middle School, and Upper Secondary Examinations; but, owing to the want of teachers, it is taught in very few schools, and even in these the instruction given must be far from satisfactory. The Committee does not recommend that the subject should be made compulsory, but suggests that the efforts of the Government should be directed to encouraging the study of it and providing facilities for the training of teachers. In order to secure this object the Committee considers that special scholarships must be instituted and full advantage taken of the Grant-in-Aid Code, which provides for special assistance being given to persons sent for training as technical teachers; and that *Agriculture* must be taught as an optional or compulsory subject in all District Normal Schools. The Committee acknowledges that the provision of qualified teachers can only be made very gradually, but it is of opinion that if the policy sketched above is pursued steadily for a few years, marked progress will be made in the spread of agricultural instruction; and in support of this view the Committee refers to the rapid extension of the teaching of *Hygiene*, since that subject has been regularly taught in elementary Normal Schools.

Views of the Government.

11. His Excellency the Governor in Council agrees with the Committee in giving education a prominent place amongst the desiderata for a generally improved agricultural system, and this is being supplied as fast as circumstances will permit: but the long established usages of the cultivating classes, partly founded on ignorance, partly on poverty, and partly on custom to which they adhere with the tenacity of religious conviction, can only be changed or removed when desirable by special teaching and demonstration, and by instructors who can plainly show the people that new methods are real improvements adapted to Indian agriculture, apart from systems sanctioned by Western theories and Western practice. Special instruction in agriculture, however, is almost non-existent owing to the want of men competent to give it. The Committee proposes the system which has been described above, but although a scheme of this kind may become possible in the remote future, it is not practicable now, and must be replaced by something which, though less ambitious, is more in accordance with existing means and yet not inadequate to existing requirements. The scheme which, in the opinion of His Excellency the Governor in Council, fulfils these conditions will now be briefly sketched.

Combined schools and farms.

12. At or near the head-quarter station of five representative districts there should be established a combined agricultural school and farm. The school should afford general instruction up to the Upper Secondary grade and special agricultural teaching up to the standard of the present junior department of the College of Agriculture. The farm should be worked principally in the interests of the school, but should also be available for experiment and demonstration. It should be under the management of the head master of the school, who, as well as the second master, should be a graduate of the Saidapet College and capable of personally working farm implements and handling cattle. These farm schools will be educational institutions, managed by the Director of Public Instruction, but the Director of Agriculture and his Assistant must be freely consulted as to their working, and the farms, so far as they are institutions for inquiry, experiment, and demonstration, will be under the exclusive control of the Agricultural Officers. The necessary funds will be provided in the budgets of the two departments, the charges common to both being distributed in such proportion as may seem suitable. It will in time become possible to connect these schools with the District Normal institutions, and by this means a class of teachers specially trained in agriculture will become available for supplying agricultural instruction in ordinary Primary and Middle schools.

The Board of Revenue should carefully consider the question of the location of the schools and submit a statement of its views on the matter to the Government. The institutions must be within easy distance of a railway station so as to allow of frequent inspection by the Assistant Director, and for this reason, if it is decided to locate one in the Kistna district, it will be better to have it at Guntur or Bezvada instead of at the Collector's head-quarters. In determining what five districts should be selected, special regard must be paid to the importance of obtaining conditions of soil, climate, and agricultural practices that are representative of a considerable area, and each farm should, so far as is possible, represent a different set of conditions.

13. The Committee has reported strongly in favour of the continuance of the College of Agriculture, and the Government fully accepts the conclusion that some such institution is an essential feature in any system of agricultural education. But with the establishment of schools in the interior providing the same instruction as the junior department, the retention of that branch, which is said to be an impediment to the higher work of the College, is no longer necessary, and it will accordingly be closed. The Government is further of opinion that the instruction afforded should be confined to agricultural and veterinary science, and that the necessary knowledge in other subjects should be secured by raising the standard of the entrance examination. The First-in-Arts Examination of an Indian University would probably be a sufficiently high test, but on this subject and on the questions of the length of the course, the nature of the curriculum, &c., it is not possible to pass orders at present, for, as is pointed out in the Report, these are matters for the consideration of a committee of experts. The Director of Public Instruction should appoint such a committee at an early date, and after consultation with the Director of Agriculture, he should submit proposals for the orders of the Government. It seems very desirable that the instruction given should be much more practical than it is at present, and limited to subjects directly connected with agriculture. In order to secure this object the farm attached to the College should be extended, and the Director of Agriculture must have an important share in the management of the institution.

The College of Agriculture.

The Government is not in favour of any attempt being made to teach *Forestry* at the College. The subject is only remotely connected with agriculture, and the means for affording instruction in it at Saidapet could never be satisfactory.

Forestry.

14. Having now provided for schools and a college, the next matter is to connect them by means of a system of scholarships. The Directors of Public Instruction and Agriculture should accordingly consult and submit proposals for this purpose. The present scholarship scheme is not a very satisfactory one, and it must be considerably modified to suit the altered conditions. Probably the best plan will be a system of district stipends tenable at the five farm schools, and a number of college scholarships to be awarded by competition among the students of these schools, but it is unnecessary to come to any decision on this point until the proposals of the two Directors are before the Government.

Scholarships.

15. The operations in regard to cattle disease are dealt with in paragraphs 16 and 17 of the Report, and in paragraphs 41, 42, and 43 the difficulties which have been met with are graphically described. The Committee says that—

Cattle Disease.

"in dealing with diseases which, owing to the customs of cattle management and the conditions of the country, spread with immense rapidity and find a victim in every stall, we deem it hopeless for many years to attempt directly preventive and curative work over the whole area of the country, and we are absolutely convinced that the present method of placing solitary Inspectors, themselves insufficiently educated and trained, in charge of a whole district, with but little supervision, and no possible chance of obtaining local influence over so vast an area, is radically wrong. We look forward to a time when there will be a highly-trained Stock Inspector with a staff of Salutry subordinates in every taluk, when the sense of the country will be actively on the side of the preventive and curative staff, and when better stock management will remove the predisposing causes of epidemics. This is not yet within measurable distance, but we consider that the Department should at once bend its efforts to obtain as quickly as possible a considerably strengthened staff of Stock Inspectors."

In the judgment of His Excellency in Council, such a policy as this is utterly impracticable. It would require a whole army of Stock Inspectors and Salutris, and even then little could be done, in the present state of opinion, unless the members of this huge staff were given wide and stringent powers of compulsion; and when regard is had to the classes from which these men would be drawn, the comparatively low pay they would receive, and the great opportunities for oppression that they would possess, there can be little doubt that the authority entrusted to them would be so gravely abused that the remedy would be infinitely worse than the disease. The present Act in fact has been tolerated only because it has never been put fully into operation, and to endeavour to give real effect to it would, in the opinion of His Excellency in Council, be an unwise and mischievous measure.

Committee's proposals impracticable.

Moreover, the Government doubts whether the effects of disease are so serious as is generally represented, and the report contains some remarkable opinions to this effect. Mr. Benson considers that the losses from cattle disease are not really great on the whole, and Mr. Robertson maintains that they result from the impoverished condition into which the stock too frequently get, and not from the severity of the diseases that prevail. The number of cattle

Effect of disease exaggerated.

that die of disease is undoubtedly large, but it is admitted that the rate of mortality is far from a high one, and the cases in which the ploughing cattle or the more valuable animals are completely swept away, or even seriously affected, are comparatively few. As Mr. Benson has pointed out, cattle must die of something; in this country they are not, to any appreciable extent, slaughtered for food, and if epidemics were entirely stamped out, the result, under present conditions, would be that cattle would multiply far beyond the means of subsistence, so that, besides further deteriorating in quality, they would perish from starvation in no less number than they do now.

Attitude of the raiyats.

It appears to His Excellency the Governor in Council also that sufficient weight has not been given by the Committee to the attitude of stock-owners towards the operations of the department. The dealing with cattle-disease is a most difficult operation even in a highly civilised country, requiring a very large number of highly skilled persons and the co-operation of thoroughly organized local authorities, as well as the hearty support of the farming class. But the evidence which is contained in the Board's report of the 23rd March 1889, and in all similar reports, conclusively establishes the fact that such conditions exist nowhere, and are not likely to be found until after the lapse of a very considerable period of time. The raiyats not only will not co-operate, but they offer passive or active obstruction to all efforts to assist them.. In the latest report of the Inspector of Cattle Diseases, which the Government has seen, that officer writes as follows:—

"The raiyats generally look upon us with dislike; they do not desire our help; they are caused a certain amount of trouble by the erection of a pound and the impounding of their cattle, and they do not like the trouble and do not think the removal of the sick from the healthy any use. At Agnigundala a great resistance was made to the sick cattle being removed to the pound and some cases have been brought to the notice of the Magistrate."

It is this state of feeling on the part of the farming classes that has been the chief cause of failure in the past. The staff has no doubt been insufficient and proper supervision has been impossible; but even with this imperfect organization appreciable good would have been done if it had not been for the opposition, religious scruples, apathy, and ignorance of the raiyats. It is admitted on all hands that to continue on the present lines is utterly useless, and there is a general consensus of opinion that no improvement can be effected unless a very expensive staff is entertained and invested with wide and summary powers. But for the reasons set forth above His Excellency the Governor in Council considers that the grant of such authority would be fraught with grave danger to the people, and that the expenditure of so large a sum as would be required cannot be justified. It may also be remembered that all attempts to deal with rinderpest in England, without the power of slaughter, are considered useless, and such slaughter in India is not to be thought of, even though provided for in Act II of 1866. His Excellency in Council is constrained, therefore, to accept the conclusion that the money hitherto expended upon attempts to cope with cattle-disease has been practically wasted, and that until the spread of education has effected a change in the attitude of the raiyats, it would be wiser to suspend the attempts to directly combat the evil. Operations in this direction must, therefore, be discontinued, and this branch of the Agricultural Department will accordingly be abolished for the present. The Act will not be repealed, but the notifications applying it indefinitely to certain localities will be cancelled, and in future its provisions will be put into force only on the occasion of large cattle fairs, which are especially dangerous as *foci* of disease.

Operations must be suspended.

16. The changes in policy which have been described above will necessitate considerable modifications of the existing staff of the Department. The present Assistant Director of Agriculture will be chiefly employed in organizing and supervising the new Farm-schools, and will have little time for conducting inquiries into the methods of agriculture followed in the various parts of the Presidency. It has already been stated that such inquiries seem to the Government to be essential, and His Excellency in Council has therefore resolved to apply to the Secretary of State for a second European expert, who will be primarily employed in investigations of this nature and will also be available to take Mr. Benson's place when required to do so. Two of the Agricultural Inspectors can be attached to this officer, and employment can no doubt be found for the others in connection with the new Farm-schools.

Organization of the Department.

The abolition of the post of Inspector of Cattle-Diseases will set free a veterinary officer, but his services will be required as Vice-Principal of the College of Agriculture and for the supervision of veterinary matters connected with the farms. There should be a small veteri-

nary hospital attached to each of the five district farms, and for the charge of these the best of the Stock Inspectors should be selected, the services of the others being dispensed with. The usual notice should be given to them at once, but they will be retained in their present posts until the sanction necessary for the abolition of the appointment of Inspector of Cattle-Diseases has been obtained. The Deputy Inspector will remain in charge of pony-breeding operations, which should be persevered with. There remains only the Sub-Assistant Director of Agriculture, and the Director will report how he proposes to employ him. The Board and the Director of Public Instruction should draw up an estimate showing clearly the total cost both of the agricultural establishment proper and of the college and new schools. The Government desires that this estimate may be submitted with as little delay as possible.

Summary.

17. The foregoing scheme provides only for a beginning being made in the task of improving the agricultural methods of the country and is neither so elaborate nor so costly as that put forward by the Committee. What the cost of that scheme would be is nowhere stated, and it is difficult to frame even an approximate estimate of it. The amount would, however, undoubtedly be very large and on this account alone it would be impossible to accept the proposals in their entirety, for the necessary funds cannot be found, and even if the money were available, it would be most unwise to disregard the lesson taught by past failures and rashly embark on any extensive and costly policy until experience had shown that action was being taken on proper lines. The measures which the Government has ordered to be carried out will involve only a slight increase in the total expenditure on agriculture, as the saving produced by the abolition of the cattle-disease establishments will be almost sufficient to meet the extra charges due to the changes in other branches of the department. The Government scheme, however, is capable of almost indefinite expansion, and if it is found, after a sufficient trial, that the work of reform is proceeding in the right direction and that the degree of success obtained is sufficient to justify further expenditure, it will be easy to extend the field of operations without making any change in the general character of the policy.

Minor recommendations.

18. There remain a number of recommendations which His Excellency in Council has not yet dealt with, and the more important of these will now be noticed.

Redistribution of work of Board.

19. The Committee has recommended that "Irrigation" (including the control of minor Irrigation works), "Forests" and the operations under the Land Improvement Act and the Agriculturists' Loans Act should be dealt with by the Commissioner of Revenue Settlement instead of by the Land Revenue Commissioners. The Government is opposed to the transfer in the case of "Forest," but it sees no objection to the suggestion so far as the other subjects are concerned. The Board will be requested to report upon the matter.

Legislation to define status of raiyat.

20. The recommendation that legislation should be undertaken for the purpose of defining authoritatively the status of the raiyat need not be noticed at length, for it is made under a misapprehension of the real facts. The ruling in *Fakir Mahomed* vs. *Tirumalachariar*, upon which much stress is laid by one of the witnesses before the Committee, has not been followed by the High Court (See Indian Law Reports (Madras) V, 163, and VI, 303), and as a matter of fact the Government never has treated raiyats as tenants-at-will, nor has the Government any intention of revising the classification of soils. This principle has been repeatedly laid down and is very clearly stated in the Settlement Manual. The statement to the contrary in the Manual of Administration is incorrect and the re-classification of the Chidambaram taluk is not a violation of the assurances of Government, as this taluk has never been settled on the system now followed throughout the rest of the Presidency.

Exhibitions.

21. The Committee reports that there is a general disbelief in the success of exhibitions and shows conducted on the lines which have hitherto been followed, and in the following passage it recommends that they be abandoned :—

"The evidence before us, which gives both official and non-official experience, is almost unanimous in rejecting exhibitions of the present class, as a means of educating raiyats who do not possess the competitive and commercial spirit, and of whom not one in a thousand hears of the show. There is also much evidence that the prizes are, in the majority of cases, taken not by the producers, but by mere purchasers of samples; the prizes themselves are, moreover, too insignificant, the chance of winning one is far too small, and the connection with improvements in cultivation is too indistinct to afford the smallest inducement towards improvement. In the matter of stock, the inducement afforded even by local shows, as in Nellore, is doubtful; most excellent cattle have been bred there from time immemorial, and we cannot say that the breeds have been improved by the local shows. We are, therefore, strongly of opinion that the present system of exhibitions has

had and will have no result, owing to its inability to excite the interest of the raiyat, to stimulate his hopes and desires, or to arouse competition; and we recommend therefore that it should cease."

His Excellency the Governor in Council concurs generally in the view taken by the Committee, and exhibitions of the nature hitherto attempted will be discontinued, the money being diverted to more useful modes of aiding the cause of agriculture. The Government considers, however, that shows for cattle and ponies will prove useful, and these should continue to be held, but the expenditure on them must not be great.

Agricultural test for Revenue Inspectors.

22. The Committee is of opinion that a knowledge of agriculture would be of great advantage to a Revenue Inspector, and it recommends the gradual introduction of a rule restricting such posts to persons who have obtained the preliminary group certificate in agriculture. A somewhat similar proposal was made by Mr. Grigg in 1884, but was negatived by the Government, and His Excellency in Council sees no reason to modify that decision now. He does not attach the same importance to a knowledge of agriculture in a Revenue Inspector as the Committee does, and unless a considerable addition is made to the salaries it would be impossible to get men with this special knowledge.

Conclusion.

23. His Excellency in Council believes he has now noticed all the matters of importance which are dealt with in the report, and it only remains for him to express his cordial thanks to the members of the Committee for the valuable assistance which their inquiries and suggestions have afforded him in the settlement of a difficult and complex question. The acknowledgments of the Government are also due to the gentlemen who favoured the Committee with their views upon the matters submitted to them; and, lastly, His Excellency in Council desires to specially mention the excellent work done by Mr. Nicholson, whose great interest in, and extensive knowledge of, the subject must have been of incalculable advantage to his colleagues.

APPENDIX F (*vide page 44 of Proceedings*).

Note by Mr. J. B. Fuller, *Commissioner of Settlements and Agriculture, Central Provinces, on Agricultural Improvements.*

There could, of course, hardly be a greater mistake than to suppose that the principal means of bettering the agriculture of India lies in the introduction of European processes or implements, or that an Experimental Farm forms an indispensable nucleus for the spread of improvements. This idea has been repeatedly negatived by the Government of India. But I venture to think that Provincial Agricultural Departments and their critics show a tendency the one to give special prominence to what I may call *exotic* methods of improvement, and the other to gauge results by the progress made in the introduction of these methods. Annual reports treat in full detail of European ploughs, pumps, the use of bone manure, ensilage, &c., but contain comparatively little bearing on the improvement of agriculture on purely indigenous lines. There are two reasons to explain this. In the first place, we have far more knowledge of European than of Indian agriculture at our command: the *dicta* of European exports give us an easy code of instructions; whereas laborious investigation is required before we can trace out the causes which have stimulated development in some parts of India and have retarded it in others. In the second place, any attempt to deal with agricultural interests comprehensively inevitably leads Agricultural Departments into trespassing on the domains of the higher Revenue authorities, who feel themselves responsible for present conditions, and are apt to resent any suggestions for changing them. Agricultural Departments, I venture to submit, have a tendency to spend too much time over trifles, because it is only in trifles that their authority prevails.

2. Measures for the improvement of agriculture may be classified according as their object is—

(1) the more complete utilisation of existing resources;

(2) the extension to one part of the country of processes known and practised in another part;

(3) the introduction of processes which are foreign to the country.

3. I venture to make the following brief notes regarding the measures which suggest themselves under each of these classes:—

The utilisation of resources which are already known to the people.

(*a*) The most prominent of the measures which have been taken under this head is the *extension of irrigation* by means of works (such as the Ganges canal) constructed

by the direct agency of Government. Comprehensive schemes have been worked out for canal irrigation in these Provinces, but have not been prosecuted owing to the existence of grave doubts as to the real utility of irrigation under local circumstances for crops other than rice, sugar-cane, and vegetables. This is a question which still requires most careful investigation. There is, I think, a field for the construction of Government tanks in the uplands of the Mandla and Balaghat districts, where the land is the property of the State, and is well fitted for rice cultivation were irrigation available, but is at present for the most part waste. The expediency of constructing tanks in this locality will shortly be considered when its raiyatwari settlement is taken in hand.

In connection with this subject, reference may be made to a scheme for taking power by law to remove obstacles to private tank-making which originate in the jealousy of individuals. There can be no question that the construction by private individuals of large tanks, such as are of common occurrence in the Bhandara and Chanda districts, has almost entirely ceased under British rule, and one reason for this is to be found in the development under our laws of individual at the expense of communal rights. It is almost impossible for a man to construct a tank without submerging or otherwise damaging land belonging to others; and, under the law as it stands at present, the objections of these latter cannot be overruled. In the original draft of the Provincial Revenue Act as framed by Mr. W. B. Jones in 1881, provision was made for the interference of Government in these cases for the compulsory expropriation of the necessary land on payment of compensation by the person whose tank would submerge it. These provisions were struck out of the Bill in its passage through Committee, but it is a question whether the case is not one in which action could fittingly be legalised by an amendment of the Land Acquisition Act.

(*b*) There seems to be a *primâ facie* case for the interference of Government to promote the establishment of *village fuel reserves*, and thus obviate the necessity of using manure as fuel. A very large proportion of villages contain waste land of little or no agricultural use which has been stripped of every kind of herbage by indiscriminate grazing, but which, if properly conserved, could produce brushwood and small trees which would be of great value to the villagers both for fencing purposes and fuel. Where the land belongs to Government and is settled with raiyats direct, the appropriation of waste land for such reserves offers no difficulty, and in the Sambalpur district, in which proprietary rights have not been alienated, arrangements have been made at the settlement just concluded for reserving a considerable number of tracts which are to be managed, under the Deputy Commissioner's control, by a Committee of villagers purely for village purposes, and not with any view to revenue considerations. But in districts where the land is held by private proprietors, interference is impossible without legal warranty. In this matter also the development of individual rights has been injurious to the community. The waste land is the property of the proprietor of the village, but he is bound to allow the tenants free user. The interference of Government offers the only means of maintaining the rights of the tenants, while conserving the waste for the benefit of the community. It may be possible to provide for the formation of village fuel reserves under the rules for the management of private forests which are now being framed under Section 124 of the local Land Revenue Act.

(*c*) Of measures which do not depend on the direct interference of Government, the most important is perhaps *education*. This, to be effective from the present point of view, must reach the actual cultivators of the soil, that is to say, it must, over the greater part of India, be given in vernacular and in the village schools. Agricultural colleges or classes in which teaching is given in English may be of service from the educational point of view, and as a means of supplying the Government with a better trained class of servants than the present system of Arts teaching affords. But for very many years their practical influence on agriculture must be of the slightest, as only a very small proportion of the students can be expected to take to agriculture as a profession. As in other colleges and classes, where instruction is given in English, their students learn in order to secure Government employment, and not to acquire knowledge which is to be turned to practical account.

An Agricultural Class has, within the last two years, been established at Nagpore, in which a two years' course of instruction is given in theoretical and practical agriculture. It promises to flourish. But its students aim at Government service, and have no intention of taking to agriculture. As servants of Government their attainments may have some influence for good. But the practical effect will be very slight.

The question is whether, in the present imperfect state of our information, we can safely aspire to teach agriculture to the raiyat. I do not think that we can venture beyond principles. But I am disposed to think that instruction in the principles of agriculture, though it will not of itself help a man to plough or sow, will not be altogether barren. There is a chance that it may lead the people to think more for themselves and to be less bound by custom and less apathetic in the matter of their cultivation. It is easy to go too far in criticising the methods followed by the raiyat. But it is undeniable that agricultural improvement is hindered by prejudices, and the effective teaching of agricultural principles may go some way to weaken the prejudice against change.

The mere addition of a text book of agriculture to the subjects taught in village schools will be of little service. Arrangements must be made to train the teachers, if the lessons are to be anything more than mechanical cram. A primer of agriculture has, under the Technical Scheme inaugurated by the Chief Commissioner, been introduced into village schools in these Provinces. But this measure will be very imperfect, unless it is supplemented by a normal class in agriculture. Proposals have been drawn up by the Inspector General of Education for the establishment of such a class for village school-masters in connection with the Agricultural Class at Nagpur.

(*d*) A great deal can be done by executive *encouragement* on the part of Government, even, although this encouragement may not be supported by any pecuniary advantage. It is too often taken for granted that the question of improvement is merely one of profit and loss; and this is especially the case in discussions touching the exemption of improvements from assessment. But the fact is that men spend money on improving their lands quite as much from feelings of sentiment as from a nicely calculated hope for profit, and it is admitted that the existing rental of land in highly developed countries returns a very small percentage on the capital value of all the improvements which have been made in it. In a vast number of cases, a man spends money on his land as he spends money on his family, because it is his own and he takes a pride in it; and Government can do a good deal in various ways to foster this feeling. One of the most signal instances of land improvement in India with which I am acquainted is afforded by the Bijeragogarh pargana of the Jabalpur district. Before the mutiny, this tract was a Native State. Its soil is particularly poor and unpromising, but one of its last rulers made it his policy to encourage the embanking of fields by granting a superior status to all raiyats who spent money in this way. The result is very striking, the pargana having been in his time embanked almost from one end to the other. A similar policy led to the construction of the magnificent irrigation tanks in the Bhandara and Chanda districts. By the indiscriminate conferral of proprietary and cultivating rights, Government has divested itself of the power of stimulating improvement in this fashion. But in temporarily-settled Provinces the recurring revisions of the land revenue demand still offer it an opportunity for somewhat similar encouragement. In these Provinces it has not been accepted as a principle that improvements are to be exempted from assessment in perpetuity, and, save in the case of specially costly works, the Government has gone no further than to exempt from assessment at the next following settlement. Experience is showing that this concession is amply sufficient. Since it has been made known to the people, the embankment of land in the northern districts has received very remarkable extensions. More fields have probably been embanked during the past two years than in the whole course of the 20 years preceding, and this, too, although the current settlement is on the eve of expiry, and survey operations have been in full swing. My enquiries indicate that this is due not so much to any definite feeling of security against assessment as a general idea that the Government wishes people to embank, and will deal liberally with them if they do so. The enhancement of land revenue against which they are protected is trifling. But

no pains have been spared to bring home to the people the wishes of Government. Sanads are given, improvements are formally registered by the patwaris, and thousands of vernacular notices have been distributed. It may be remarked in passing that the expenditure of so much money in embankments just before the revision of the Government revenue demand indicates that the periodic resettlement of the land revenue is, when proper precautions are taken, not the discouragement to land improvement which it is often supposed to be.

(*e*) Another means of stimulating improvement, especially the improvement of seed and cattle, is afforded by *agricultural shows*. No such shows have as yet been organized on a proper basis in the e Provinces. Prizes are awarded for produce and cattle at some of the larger fairs, but I fear that they are merely so much money wasted. The distribution of prizes is, of course, useless unless the prizes reach the right people. And I apprehend that, under present circumstances, this is rarely the case. Were qualified judging Committees insisted upon and the grant of prizes made widely known through the country-side, I think that some good might result, especially if the prizes were such as would be valued by the better classes of raiyats, such as certificates and puggris of honour.

(*f*) Strong views are held against the *assignment of land revenue* to private persons, but there can be no doubt whatever that by the grant of small assignments a most potent stimulus might be given to certain classes of improvement of a *quasi*-public character, such as the digging of wells, the construction of tanks or tree-planting. Revenue was commonly released for these purposes under Native rule, and the inducement is one which is appreciated by native landholders at far above its money value. Thousands of rupees have been spent and wasted on road-side arboriculture, for which small grants of revenue might have been most profitably substituted. Endeavours have been made to enlist the help of the people in road-side tree-planting by making over to them the fruit of the trees. But this has not proved very successful. I am not able to write with certainty on the point, but I think that, if Government was prepared to remit the revenue of a few fields in a village on condition of the proprietor's planting and maintaining trees on roads running through it, we should find many men quite willing to undertake the work. So also, in the case of the construction of wells or tanks for drinking purposes.

(*g*) The direct assistance now given the people by *loans* of Government money under Acts XII of 1883 and XIX of 1884, is thoroughly appreciated by them, and promises, if judiciously extended, to become a most important factor in agricultural improvement. Within the last four years the amounts loaned out have risen from R41,168 to R1,43,150 a year. They are recovered without difficulty, and are accepted by the people as a very tangible indication of the interest taken by Government in their welfare. The Acts would be of still more value did they admit of the loaning of money on good security to pay off debts carrying high interest previously incurred for agricultural purposes. However largely the system of Government loans may be extended, it will still, of course, supply but a very small proportion of the capital required for the agriculture of the country. But its effect will reach far beyond the men who are immediately benefited. The very exorbitant rates at which interest is now charged for small loans are based on custom and not on market value, and the loaning out by Government in a district of a much smaller sum than that required to carry on its agriculture will go far towards breaking down this custom and reducing interest charges within reasonable limits.

(*h*) There are no doubt cases to be found in which agriculture is hampered by *over-assessment of Government land revenue*. The introduction of any measures which would tend to lessen the popular belief in the rigidity of the Government demand is, I think, to be much deprecated except for really urgent reasons. Our revenue is paid in with so much regularity and so little trouble, mainly because its payment is regarded as absolutely inevitable. Arrears would rapidly accumulate, were an idea to get about that remissions could be obtained without much difficulty. At the same time, I have come across cases (not in these Provinces), where the land revenue demand was really excessive and reduction was urgently called for; and, under these circumstances, agriculture must necessarily become degraded, unless prompt and sufficient relief be given.

(*i*) Lastly, there is the question of lessening *agricultural indebtedness*. Separate representations have been lately made on this subject by the Administration of these Provinces, and I need do no more here than note that the circumstances under which a considerable proportion of the land is now cultivated are such as to absolutely bar improvement. The raiyat is virtually the bond-slave of the exporter—his rent is practically the whole of his crop, *minus* a subsistence allowance, and he has no inducement whatever to improve the outturn. I need not point out how harmful these conditions may be in, for instance, preventing a proper rotation. Wheat is required by the creditor and wheat must be sown year after year, although the land may urgently need a change. It may be remarked here that the common practice of borrowing seed-grain is of course incompatible with any improvement by seed selection, unless the lender can be induced to select before advancing.

4. I now come to the second class of measures which aim at *extending to one part of the country processes known and practised in other parts*. The differences between the methods of agriculture followed in various parts of India are of course in greatest measure essential, and result from differences in local conditions. But, unless we are prepared to admit that agriculture has progressed with equal strides throughout the whole country, it follows that some parts can in all probability copy with advantage from others. The precise matters in which imitation is possible require, of course, great knowledge and experience for determination. It is extremely easy to make mistakes, and, owing to an imperfect acquaintance with local circumstances, to wrongly conclude that a process which is successful in one tract can be extended to another. Much success in this direction cannot be hoped for, unless Agricultural Departments are officered by men who are not only trained in agricultural science, but also have an intimate acquaintance with Indian agriculture. These qualifications cannot be expected in the Heads of Departments, who are, and must continue to be, selected principally for administrative reasons. Very little success can be expected, unless a permanent technical assistant is attached to each Department. Natives of India who have passed through an English Agricultural College, and have subsequently (or better still having previously) made a study of the agriculture of their own country, would be the best qualified persons for this post.

Something can be done in a less ambitious way by enlisting in Agricultural Departments the services of good Native cultivators and using their agency to spread the knowledge of improvements. An instance in point is furnished by the Nagpore Sewage Farm, which was started by the importation from Cawnpore (at the suggestion of Sir E. C. Buck) of a number of Kachi cultivators and settling them on Government land. They have succeeded admirably, and their example is being followed by a number of local cultivators who were previously ignorant of the value of sewage and prejudiced against its use. During the last two seasons, a trained sugar-maker from the North-Western Provinces has been employed in demonstrating to the people in several districts that sugar-boiling can be effected economically by the use of the megass which is now discarded in these Provinces, wood being used in its place. The reports which have reached me of his work seem to show that his example has had some effect.

The distribution of good seed, whether raised on Government Farms or purchased locally, is a measure falling in this class, which may prove extremely useful, if it is guided by sound agricultural knowledge. Without such knowledge interference will result in more harm than good.

So long as the Heads of Agricultural Departments are unassisted by specialists, they can hardly venture to attempt much. It may be urged that a single specialist of high qualifications with the Government of India would suffice for the guidance of local Departments. With his assistance more could no doubt be done than at present. But, looking to the diversity of Indian agricultural systems, it seems doubtful whether he could ever acquire sufficient local knowledge to render his advice of practical value everywhere.

5. Thirdly, *of the introduction into India of foreign seeds or processes*.—Measures falling under this head, though promising less than many of those already mentioned, cannot be disregarded in the face of such instances of successful acclimatisation as those furnished by maize and the potato, and of the improvement effected by the introduction of the Bihia sugar mill. Speaking generally, improvements of this class cannot be attempted until they have been carefully proved in this country, and they furnish the principal *raison d'être* for experimental farms. For the guidance of experiments on these farms the advice of a scientific expert is greatly required. At present experiments are made very much at random, and frequently without particular reference to the precise question which has to be investigated. I cannot say that much of practical utility has resulted from the Nagpur Experimental Farm during the

seven years which have elapsed since its establishment. The results which have been obtained (as might, indeed, have been expected) go in great measure to prove the soundness of existing practices. For instance, it has been shown that the manuring of wheat land *without irrigation* is of doubtful utility, and this explains the indifference to manure of the people in wheat districts, which has often been quoted in proof of their ignorance or stupidity. On the other hand, the importance of manure to kharif crops has been demonstrated. Experiments in manuring wheat *in conjunction with irrigation* promise important results. Successful experiments have been made with a number of novelties, such as ensilage, but the only practical result which the Farm can claim in this direction is the acclimatisation and introduction of a new variety of cotton which has found some favour with cultivators in the Wardha districts.

The Farm has been of use in adding to our knowledge of the produce of the land, and now fulfils a most useful educational purpose as a practical training ground for the students of the Agricultural Class.

6. The combating of cattle-disease by the use of precautions and remedies, which have proved successful in Europe, may be briefly referred to here. The view held by the Administration of these Provinces is that very little can be done to lessen disease in the absence of legislation to enforce the isolation of infected cattle. But we have lately entertained two trained Native Veterinary Inspectors who are sent to tracts in which cattle-disease has broken out to do what they can by example and precept to induce the people to follow rational methods of treatment. They will be placed under the orders of the Civil Veterinary Officer who is under the orders of Government shortly to be attached to these Provinces and the Berars.

APPENDIX G (*vide page 55 of Proceedings*).

Dated Poona, September 1890.

From—The Agricultural Association, Poona,

To—The Director of Agriculture and Land Records, Bombay.

WE, the undersigned members of an Agricultural Association in Poona, beg you will be kind enough to lay before the Agricultural Conference, which is to be held in October 1890, our views with respect to the general improvement of agriculture and the agriculturists in the Deccan.

General remarks on the condition of agriculturists.

The Deccan agriculturist loves his land beyond everything else, but as a class he is hardly able to derive the means of sustenance from it. His holdings are generally small; constant cropping without manuring has exhausted the land, and all the labour he bestows upon it secures for him but a very small margin of profit over the expenses, very often none at all, and sometimes it ends in loss. It is no wonder then that he is notoriously indebted, and notwithstanding the measures which Government have adopted for his relief, he finds himself surrounded by all sorts of difficulties and distress.

What is to be done to improve it?

To improve his circumstances, we think it necessary that he should be placed in a position to improve the yielding power of his land, and his own intelligence and thoughtfulness, and that Government should afford him facilities to do so. He must be made (1) to manure his exhausted land, (2) to use improved methods of culture, (3) to increase the area under wet cultivation, (4) to introduce the cultivation of more productive and profitable crops, (5) to improve his educational status and intelligence, and to acquire habits of prudence and economy, and it should be the duty of Government to assist him in his endeavours in all these respects and to give him full assurance that the fruit of those endeavours will be entirely his.

Manuring land.

The Deccan agriculturist lives upon his capital. He scarcely makes any return to his land in the shape of manures. The dung of his cattle, if he has any, or if his women and children collect it from streets, he generally turns it into fuel for his own use or for sale. He sometimes gets shepherds to fold their sheep on his dry crop land, and it is only for wet or garden crops that he tries to collect some manure of cattle dung, ashes, oil-cake or rotten fish. In the neighbourhood of large and Municipal towns, where there is always some wet crop and garden cultivation, he uses night soil and street sweepings, and we beg to suggest that such manure may be conserved for him under some system of village sanitation. It is well known that Indian villages are notoriously dirty, and Government can order some arrangement by which the large quantity of dirt and rubbish can be collected together by village servants, hereditary or hired, for the purpose of manure, to be sold to the villagers just as town sweepings are sold: we believe the proceeds will considerably meet the cost of keeping the villages clean. Government may authorise some small rewards to the cultivator who buys the larger portion of this manure and uses it on his land.

The cultivator seldom produces green manure, and he knows of no artificial manure. Phosphatic manure is stated to be a very important plant-food, and the exportation of large quantities of bone to Europe for the purpose of manure clearly proves the statement. It is used on dry crop as well as on irrigated land, but the Indian cultivator almost knows nothing about it, and hence he allows it to be sent to enrich other lands instead of using it on his own. The article has now become a costly commodity, and India no doubt derives profit from the export, but it would be better if the people were taught how to derive greater profit by using the article to prevent or delay the exhaustion of their land. We beg Government will undertake to show to the agriculturist demonstratively on their model farms that it would be more profitable to him to use it than to sell it at the enhanced price.

Agricultural implements.

It has been remarked that the implements of husbandry in India are of the rudest kind and have not undergone any improvement since their first introduction. It has also been observed that they are suited to the soil of India and need no change; but we see European gentlemen have prepared new ploughs in different parts of this country which they say are better fitted for the soil, and when we take into consideration the great and steady application of mechanical and chemical sciences to the improvement of agriculture in Europe, we are forced to the conclusion that our agricultural implements and methods of working need improvement. We beg that Government will undertake to test on its model farms the efficacy of implements prepared on scientific principles, either in England or India, whether they be ploughs, harrows, cultivators, drills, hoes or thrashing machines, and if found to be superior to the native implements, make known their advantages to the people. They might also advertise for improvements in the existing tools or invention of new ones well suited to the Indian soil and reward those which may be found to be the best.

Irrigation Works.

Government have spent large sums of money on the construction of larger canals and irrigational works, and certainly they have become very useful in increasing the areas under wet crops and lessening the effects of droughts. Government afford assistance in the shape of Tagai to cultivators who wish to repair or dig new wells. There are, however, numerous smaller rivers and streams which are capable of irrigating large portions of land during some months of the year, if not the whole of it, and the damming and improvement of which will be as useful as the construction of larger canals and more useful than the construction of wells. We beg Government will pay greater attention to such works than they have hitherto done. The cost of them will be comparatively small, but on account of their scattered and higher positions, their use, we think, will be more widely spread than of the larger works and the extended irrigation will lead to greater attention being paid to the culture and manuring of land.

Introduction and improvement of food and other plants.

We would urge on the attention of Government the desirability of introducing into India of such food and forage plants as are found to give elsewhere greater or superior yield or afford the means of sustenance to man and cattle or add to the commercial products of the country. We are sensible of the benefits accruing to the country by the cultivation of improved varieties of such plants as potato, maize, sugar-cane, cotton, tobacco, and the introduction of tea, coffee, arrowroot, cabbage, white pea, beans, and lucern, and we hope that Government will try themselves and give facilities to others to introduce and acclimatise other plants conducive to the welfare of the people. Rice and wheat are the staple cereal productions of India, and any varieties of them can, we think, be successfully introduced into the country. Carolina rice has been spoken of as superior to any and commands the highest price in England. In the same way Palestine wheat is stated to be the most prolific in production, and we beg that a more careful and extended trial may be given to the cultivation of both of these important food-plants.

Experimental and model farms.

We are of opinion that Government should maintain in an efficient state one experimental and model farm in each province of the Presidency, and a subordinate farm in each collectorate. In these farms experiments in ploughing, manuring, introducing new sorts of crops and plants water-lifts, &c, should be carefully conducted and the results of them noted and published in the vernacular of the province for the information of the people. The farms should be not as they are at present in which the cultivator has scarcely to learn anything, but model farms in the true sense of the word, in which the different operations, processes, raising, reaping, and thrashing of crops, and rearing of useful plants, should afford to the visitor ocular proofs of the superiority of the methods and the results, and should induce him strongly to try them on his own lands. Every facility and encouragement should be afforded to the agriculturists to visit these farms, and the improved methods of culture should be explained to them. Annual

reports of these farms giving results of experiments should be published in vernacular and distributed for the information of the people, and copies may be given as prizes to the children of agriculturists in schools.

We think the Provincial farm should be under the management of a European well trained in the theory and practice of agriculture and horticulture and having Indian experience. He should have one or two native assistants under him educated in Indian agricultural schools and preferably belonging to the agricultural classes. The zilla farms should be under the management of natives who shall have served as assistants for some time under the superintendents of provincial farms, and certified to be qualified to have independent charge of zilla farms. We feel sure that by study, practice, and experience, natives will in time be able to take charge of Provincial farms.

Agricultural Shows.

As a sequence of agricultural farms, we recommend the holding of shows and exhibitions of agricultural products, generally at the places where the farms are maintained. Suitable rewards may be awarded to those whose exhibits have, in the opinion of the examiners, cost special care and attention in their production. The farm-manager will, of course, send exhibits, but he should not compete for prizes, which should entirely be left for private exhibitors. We know that such shows have stirred up healthy competition among neighbouring producers and induced dealers to order out exhibits from distant parts. The exhibits need not be confined to the zilla or the province, but should include products of other provinces, and if possible of other countries so as to place before the cultivator the best samples for production by himself. Agricultural implements should also form part of the exhibits and should be tried before the visitors.

Government should assist the cultivator in procuring for him the seed or other things which he may wish to buy for use on his own land. In fact he should be encouraged to do so and informed that the constant use of the same seed deteriorates the produce, and that it is necessary to change seed to improve it. When he sees the produce and the seed placed side by side at the Show and when he also sees that the former is of a better kind than his own, he will naturally be inclined to buy some seed and try the experiment; and Government should assist him, not only in procuring the seed, but furnishing him with information necessary for the success of the trial. The same may be said of other articles shown at the exhibition.

Education of the agriculturists.

To the means enumerated in the foregoing paragraphs it is necessary to add general education to improve the condition of the agriculturists. He is lamentably backward in this respect. Ninety-five out of a hundred cultivators cannot read or write, and very few can count up beyond twenty. Village schools should be more thickly spread than they are at present, and, besides the knowledge of the 3 R's, elementary instruction in agriculture, showing the advantages of ploughing, harrowing, hoeing and manuring, the rotation of crops and the selection of seed should be given from books specially prepared on the subject. It is necessary that the village teachers should have received instruction in the principles of agriculture, and the subject should be taught to the pupils of Training Colleges, and demonstrated by the working on the zilla farms, to which they should be taken once a week. If practicable, farms may be attached to Training Colleges, where the teacher will be able to illustrate his lectures more frequently and get his pupils to do practical work. We are of opinion that the teaching of agriculture in Training Colleges, the pupils of which are intended for village schools and some of whom are sons of agriculturists, will be more useful to the people than the teaching of it in High Schools or Colleges, to pupils of higher classes whose connection with the agriculturists can seldom be very great or intimate.

Agricultural education to higher classes is also necessary, for no great improvement can be expected in this Department if steps are not taken to teach improved processes of agriculture to those few who can, in after-life, turn their knowledge to account. All processes of improved agriculture imply expenditure of money, habits of foresight and thrift, and general development of intellectual power. These are conspicuous by their absence in the majority of actual cultivators of the soil. The English farmers, and not the agricultural labourers, have effected all the improvements accomplished in that country during the last 50 years, and the growth of such a class is only possible where education and competence are combined. The teaching of agriculture therefore must touch and vivify, so to speak, the upper classes, and when these master the processes, the good influence will slowly penetrate in the lower strata of society. Agricultural education must in short follow the course taken by all other branches of education—literary and professional.

Tagai advances.

We now come to a subject which is of vital importance to the agriculturist in his present impoverished and helpless state, and we wish to draw the special attention of Government to it.

As the State in India claims the rights and advantages of its double position as Landlord and Sovereign, it must in theory at least accept the obligation of helping the poorer portion of its tenants (and they constitute in this Presidency more than 90 per cent. of the agricultural classes) to effect improvement in their lands. The Viceroy, Earl of Mayo, as far back as 1870, justified the creation of a separate Department of Agriculture on the ground "that the duties which in England are performed by a good landlord, and the work done by the great agricultural societies in Europe and America, fall in India, in a great measure, upon the Government, which is too often the only Indian landlord who can command the requisite knowledge and capital for the improvement of the land." The Government has accepted this obligation in the abstract, and every year a sum of a few lakhs of rupees is set apart in the budget of each presidency for granting subsidies in aid of local improvement works to deserving and needy raiyats. The obligation is, however, so very scantily recognised in actual practice that the amount spent during the last three years in this Presidency has ranged from Rs. 80,000 to 90,000 upon a total land revenue collection exceeding three crores. In the Madras Presidency the sums spent show even smaller proportions. It is true the Government spends vast sums in the development of large irrigation and railway works, but such expenditure does not, by itself, remove the necessity of adopting a more liberal policy in respect of helping the poorer raiyats to improve the lands held by them. The Tagai rules have been in this Presidency lately revised by Government so as to enlarge the powers and discretion of District Revenue Officers, and remove the restrictions with which the exercise of such power was till very recently hemmed in, and relax the strictness with which punctual repayment was enforced. It is our firm conviction, however, that no mere change in rules will mend matters to any large extent, and that a change of system is necessary if due effect is to be given to the benevolent intentions of Government. (1) In the first instance Government must encourage its officers to deal liberally in the matter of these advances. The success of District administration must to a large extent be measured by the number of small improvement works undertaken by the raiyats with Government help. (2) Such a change in spirit will be materially helped if the work of granting these loans for land improvements is handed over to the Department of Agriculture. It will thus be brought into direct connection with a large and increasing sphere of usefulness and its hold upon the more enterprising raiyats will be strengthened in a way which cannot fail to be of immense benefit. The agency entrusted with the collection of land revenue is necessarily not the fittest agency for stimulating useful expenditure, and the change here suggested will restore the Director of Agriculture to the position occupied under native rule by the old Deshmooks and Deshpandes, who discharged many of the functions of inquiry, report, and stimulation of the improvement of land, &c., which belong to the new department. (3) Thirdly, we would suggest that the Director of Agriculture should be helped in this and other work by associations of local agriculturists. The Talooka Local Boards are a convenient agency through which the Director of Agriculture can make enquiries, and these can help him by their knowledge and experience to turn to the best account this benevolent liberality of Government. (4) We would lastly suggest that in many of the districts liable to droughts and famine, Government might well permit the raiyats to go on paying 6 per cent. interest on sums advanced to them, and levy this interest charge as an addition to the assessment as long as the principal remains unpaid. In this way the interests of Government revenue will be properly protected, and the desire for improvement stimulated to an extent not hitherto realised. If the four-fold improvement in system suggested above is carried out, we feel sure that the present stagnant condition of Indian agriculture will undergo a most healthy change for the better. It might indeed be said, and in fact has been said, that Government assistance is not needed by the raiyats and that the Tagai advances are inconsiderable by reason of the unwillingness of the raiyats to borrow money from Government. It is also urged that Government has no right to enter into competition with private capitalists. This latter fear is more imaginary than real; for the lakh or two spent by Government in this way is as a drop in the ocean of many hundred times that amount annually borrowed by raiyats from private Sowcars.

The need of help to the raiyats is evidenced by the fact that in four districts in this Presidency, the annual loans equal the amount of Government revenue paid from year to year. The small Government advance will set the standard of fairness, and moderate the ardour of rapid gain felt by many of the middle-men sowcars.

The raiyats, ignorant as they are, are not so great imbeciles as not to know the value of a difference of four from six per cent. in the rate of interest. The apparent unwilligness is due to other causes, the chief of which is the desire of village and taluka officers not to be bothered

with additional work and responsibility. The four-fold improvement suggested above will, we feel sure, remove all difficulties, and give satisfaction to Government and the people alike.

Pastures.

At present there is a great and general complaint on the part of the agriculturists that all grazing lands on which they used to feed their cattle have been absorbed into Forest limits, and for want of food they have been obliged to reduce the number of their cattle and are unable to keep them in working condition. We are fully alive that under the altered condition of the country, it is not possible to rely exclusively on the wild free grass system of unrestricted grazing in village commons, and that the raiyats must learn to raise green fodder for their cattle in their own fields. At the same time it should not be forgotten that the transition from the old condition of free pasture in common lands to the new system cannot be accomplished in the way the Forest Department has sought to force it under compulsion rigidly enforced. Since the enactment of Act V of 1879 the Forest Department has been allowed by Government to exercise control over *Gairans* or village commons, Kurans proper, as also over waste lands and hilly and mountainous areas. A very large portion of Forest revenue is represented by the proceeds of these Kuran sales, and the sale of the right of grazing in hitherto free commons. The Government has conveniently ignored the obligation laid upon it by the Forest Act to provide areas for the free pasture of village cattle. Still more recently an unheard-of distinction has been made between agriculturist and non-agriculturist residents of a village, and between their agricultural and non-agricultural live-stock, and a jealous and exacting system of free and paid passes has been introduced to the great annoyance of the raiyats. We submit that the Forest Department should be limited in its activity to the areas capable of being turned into reserved and protected forests, while the transfer of control to that Department in respect of Kuran lands and village commons should be disallowed. The Agricultural Department, as most interested in village cattle, should have the charge of the village commons, and *Gairan* lands, and also of the Kurans. No loss of legitimate revenue need be feared by such a transfer, if Government fix the limit of its realisations with strict regard to the preservation and development of the live-stock of the country. She-cows and she-buffaloes, sheep and goats are of as much agricultural value to the raiyats for their manure, and their dairy produce, as the bullocks employed in drawing the plough or the water-lift. No distinction should therefore be made between the so-called agricultural and non-agricultural live-stock possessed by the raiyats.

Fixity of tenure.

At the root of all improvement in agriculture lies the question of a fixity of tenure and of the Government demand. The Secretary of State has, as far back as 1862 and 1865, approved of the extension of the permanent settlement to all settled districts where four-fifths of the area was already under occupation, and no great expenditure on Railway and Irrigation works was contemplated. Now that revision settlements have been completed over a large portion of the Presidency, the time has surely come to give effect to these declarations of policy. Even if these old promises cannot be redeemed, there is nothing to prevent Government from declaring once for all that no enhancements will take place except in consideration of a permanent rise in prices under conditions laid down by Lord Ripon in 1884, and accepted by the Local Government in its legislation of 1886, and that this enhancement will be equally distributed all over the taluka, so that there will be no unsettlement of values and no disturbance of vested interests, which are the fatal results of the present system of settlements.

In conclusion, we beg to refer to a subject which, though not immediately connected with agriculture, has a bearing with one of the important products of agriculture in the Deccan. We mean the manufacture of sugar, which, we think, is likely to be considered at the Conference.

Manufacture of Sugar.

Common country sugar is not manufactured in this part of the country except at Kolhapur, as the manufacture does not become profitable if the residual molasses is not utilised for some other purpose. In the Kolhapur State molasses is utilised in the manufacture of country liquor, but under the Government Abkari rules country liquor is not allowed to be distilled from any other substance except Mowra. A well-known and an enterprising Parsee gentleman of Poona, Mr. Adurji Dorabji Ghaswala, about eight years ago, erected a sugar refinery combined with a liquor distillery at Moondwa near Poona. He produced different kinds of sugar in this Factory and sold in the Poona market. The colour of the sugar was as white as that of the best kind of imported sugar, and in the Poona Exhibition of Native Arts in 1888 a silver medal and a certificate of merit were awarded to this gentleman. We regret to find that the only sugar refinery in the Deccan practically remains closed owing to the refusal of Government of the concession to manufacture rum and sell it claimed by the proprietor on the strength

of a promise granted him by Government. When the Factory was established in 1883-84, the Government of Sir James Fergusson promised to allow Mr. Adurji Ghaswala the permission to retail the liquor produce in his factory from the refuse or molasses left after crystallising sugar. When application was made to give effect to that promise, the Abkari Department refused to grant the permission asked for, or to tax his molasses rum as country liquor. The Governments of Madras and the North-Western Provinces have made concessions to European owners of sugar factories established in their Provinces, and we hope that the Government of H. E. Lord Harris will see reasons to grant them to Mr. Adurji as there is really no chance of the industry thriving here if Mr. Adurji's pioneer enterprise is not properly supported.

APPENDIX H (*vide page 76 of the Proceedings*).

Extracts from a note by T. W. HOLDERNESS, *Esq., C. S., Director of Land Records and Agriculture, North-Western Provinces and Oudh, dated 5th October 1890, placed before the Agricultural Conference by the Honourable Mr. Benett.*

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The leading idea of the Pargana Book, as we have it, is that it should serve as a permanent note-book for the District Officer. It gives him a few leading statistics, and he is expected to correct and enlarge them by what he sees and hears. If you alter the form in which they are given and expand them, they would still labour under the defect of all statistics, unless you add the personal observation of highly trained observers.

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The present form of Pargana Register is not perfect. If I were asked to draw out a form without regard to what already exists, I might propose alterations. But the present form, it should be remembered, was settled by the most competent Revenue Officers of the Province, after prolonged discussion, and should not be altered without a careful consideration of the record of that discussion. The Kanungo staff has become accustomed to it, and I know from experience the trouble that is occasioned by constant changes in our village and tahsil statistics.

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